GREEK AND ROMAN CHRONOLOGY

CALENDARS AND YEARS IN CLASSICAL ANTIQUITY

by

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TO MY MOTHER AND FATHER

V. F.

PREFACE

A study of chronology in classical antiquity can be many different things, and the history of scholarship in this field would illustrate many of the possibilities. The problems attracted the ancients; medieval scholars pursued them; moderns continue to attempt solutions. In the last century an enormous amount of work was done, and one problem confronting a contemporary writer is posed by the organization of knowledge effected by classicists of the last half of the nineteenth century. That work put a floor under knowledge, as it were, and began a sequence in which each successive work cited its predecessors, and the distance between evidence and statement became more and more filled with discussion. Meanwhile the evidence itself was changing and increasing. Epigraphic material proliferated. New inscriptions were found, old texts were re-read, re-numbered, and re-published. New work in chronology treated of new material, and depended upon earlier scholarship for the documentation from earlier evidence. In many cases it became necessary to have the entire assemblage of scholarship at hand in order to understand the nature of the evidence and the relative solidity of our knowledge. One might see, for example, a list of Boeotian months in many relatively modern works. But it is not so easy to find out how we know the names of the months, or the order in which they followed each other.

It seemed to me, therefore, in beginning this work, that a general principle applicable to the whole study would be: present the evidence in a form in which it is accessible today. I should like to stress this principle, because it is in large measure responsible for the form which this book has taken. Just as much as I have been concerned with what we know, have I been concerned with how we know it. In pursuing this objective, I have tried to provide a convenient means by which the reader may determine the location for the evidence for any particular statement. Where I have had to collect the evidence from wide ranging sources, or very diverse publications, I have entered the evidence item by item, and I have discussed it rather fully. On the other hand, where a problem has been discussed in a fairly recent or readily available study which represents the maximum which can be presented on a matter, I have deemed it sufficient to summarize the evidence, referring to that study. I hope in this manner to present not only a resume of what may be known about a specific matter, but also a basis for further investigation.

A study of ancient chronology can include much that is omitted here. Ideler's *Handbuch* of 1825[1] dealt with mathematical and astronomical material, with the calendars of Egypt, Babylon, the Hebrews, Arabs, Turks, Persians, *inter alia*, as well as with chronological affairs of Greeks, Romans, and their successors. Ginzel's monumental handbook[1], which will probably never be replaced, spread far beyond this, to include the far east, north Europe, and the new world. My predecessor in the 'Handbuch'-series, W. Kubitschek,[2] restricted himself more to classical materials, much as Ideler had. Bickerman imposed much the same limits on himself in the successive editions of his *Chronologie*.[3] My own scope is perhaps even more limited; the volume of data limits the daring of the writer. I have dealt with chronological matters which concern Greek and Roman civilizations. I have dealt with non Greek and Roman materials only insofar as they effected the calendars in areas with in which there was development of Greek and Roman systems, and even then, only when native systems actually survived or effected the Greek and Roman systems during the period of high antiquity. Thus I treat north European materials not at all, and Semitic and Egyptian systems only in passing.

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[1] L. Ideler, *Handbuch der mathematischen und technischen Chronologie*, 1825, second ed. Breslau, 1883, 2 volumes, cited as Ideler, I, II.

Scope involves more than geographic limits, and is concerned with the nature of the materials contained. One may deal with the workings of individual local calendars and with lists of month names, or one may be concerned rather with the general characteristics of ancient calendars, as was Bickerman. One may include hours and minutes as subjects of study, as Ginzel did and as I do not. One may examine eras and accounts of years at great length, as Kubitschek has done. It seems to me that there is little which determines the logic of scope; one's interests and abilities are the greatest factors. Nevertheless, I have tried to follow some rationale in deciding upon what I have done here.

Basically, I am trying to be useful. Within the confines of a book which deals with all of classical antiquity and which must of necessity be general, on the one hand I have tried to present enough data to provide a guide to all the major chronological problems of antiquity, while on the other hand I have spent much more time and devoted many more pages to material which has not been presented in earlier handbooks, or which, because of the accretion of evidence, must be presented again. Thus, I have studied the development of astronomical knowledge and its connections with calendaric theory and astronomical calendars at some length, because I do not know where such material, from a chronologist's point of view, may conveniently be found. Similarly, I have dealt at great length with Greek local calendars and lists of months, because there is no convenient collection of this material, with the evidence for it in its present form: the fundamental study was done by Bischoff in 1884,[4] and Bischoff's later article in *RE*, s.v. Kalender, cites only such evidence as had appeared after 1884. By now, much of the evidence has been published in new format, there has been considerable discussion of many of the calendars, and a complete reworking of the 1884 study is called for. Furthermore, I have allowed the state of modern research and the availability of information to determined the scope and extent of individual treatments of similar material. For example, I have thought it useful to present lists of Athenian archons and Roman consuls, but I have treated the two lists very differently. Because the consular lists have been studied recently and fully, with complete presentations of evidence, I have presented only the lists of names with the occasional reference to the most recent comments. For the archons, on the other hand, the situation is quite different, and I have therefore subsumed in that section a presentation of the evidence as well as a summary of the argument for the placement of the archons.

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[1] F.K. Ginzel, *Handbuch der mathematischen und technischen Chronologie*, Leipzig, Vol. I, 1906, II, 1911, III, 1914, cited as Ginzel, I, II, III.

[2] W. Kubitschek, *Grundriß der antiken Zeitrechnung* (in Handbuch der Altertumswissenschaft, Munich 1928, cited as Kubitschek, *Grundriß*.

[3] E. Bickerman, *Chronologie*, 2nd edition, Leipzig, 1963, cited as Bickerman, *Chronologie*, and the English edition thereof, *Chronology of the Ancient World*, Cornell, 1968, cited as Bickerman, *Chronology* 1968.

[4] E. Bischoff, "De Fastis Graecorum antiquioribus" *Leipz. Stud.* VII, 1884, pp. 315–416.

I may make one more observation, in this case about the treatment of the evidence. Previous studies of calendaric practice in antiquity have depended to a great extent on analogical reasoning, particularly with regard to Greek practise, and have often confused theoretical astronomical calendars with civil reckoning. The effect of the first of these procedures has been the inclusion of months in local calendars on analogy to the calendars of mother cities, or of cities in the same dialect group, and in addition, to hypothesize the order of months on the basis of analogy. But, as even a casual examination of the lists of months will show, colonies do not necessarily have all of or only the months which mother cities use, related cities may have quite different lists, and months with the same names may appear in quite different positions in different calendars. Accordingly, I have not included any months in any lists on the basis of analogy, at least not without strong caveats, nor have I used analogy in any of my own arguments for the order of months in local calendars. For similar reasons, I have preserved a sharp distinction between astronomical practice – eight year, nineteen year cycles, and the like – and civil practice. For reasons which I elucidate in my discussion of astronomical calendars, I do not think we can carry over the conclusions about these into the discussion of civil calendars. This limits greatly what anyone could say about the actual workings of civil calendars, and if I am right about this distinction, we must treat as obsolete the many discussions of the cyclical operations of local calendars.

I am reasonably comfortable with this assumption of great individualism in local calendaric practice. Although I am one to argue that classical civilization is, in a way, a unity, and certainly must be studied as a whole, I tend to think that in this unified and cohesive culture there existed an extraordinary degree of local particularity, and that this particularism persisted in the face of continuing cultural, economic, and political influences with centripetal tendencies. The calendars, central as they are to life in all the cities, show this particularism if they are not coalesced by a modern passion for order, and the longevity of many of these calendars shows the vitality of local traditions.

Toronto, January 11, 1969

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CHAPTER I

THE ASTRONOMICAL BACKGROUND

1. The Sun-Earth-Moon System

As modern astronomy recognizes the relationship between the earth, its controlling star the sun, and its satellite the moon, the sun lies at the center of a system, the earth revolves around the sun in an ellipse, its *orbit,* and the moon in turn revolves around the moving earth in its own orbit. These relationships are easily seen in a spherical model, and they may be represented two-dimensionally as in Figure 1. However, since all astronomical observations take place from the earth, an astronomical model has been devised to represent the phenomena as seen from the earth.

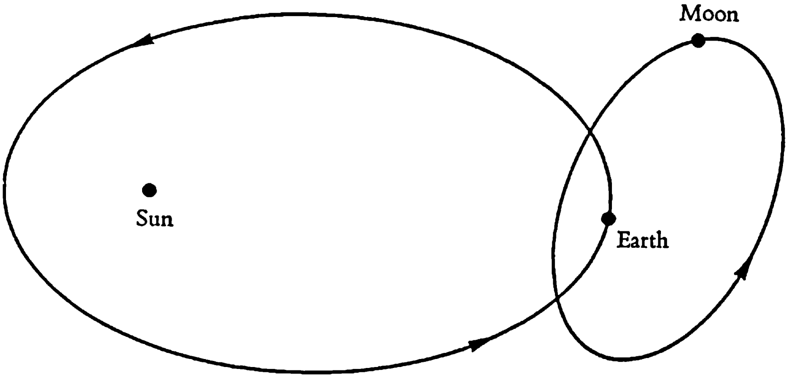

Fig. 1. Orbits of Earth and Moon

The Celestial Sphere

This model, called the celestial sphere, surrounds the observer, with him at the center, and astronomical objects are represented as points on its surface. The intersection of the line between observer and sphere defines these points, and there exist a number of conventions for defining the positions of these points. The celestial sphere, with the stars fixed in it, rotates, and it is an unchanging constant for everyone on earth, everywhere, at anytime. The sphere itself has co-ordinates, which are projected from those of the earth. The axis of the earth is projected to provide the North Celestial Pole (N′) and South Celestial Pole (S′), and projection of the earth's equator gives a celestial equator (W′E′). Figure 2 represents this sphere.

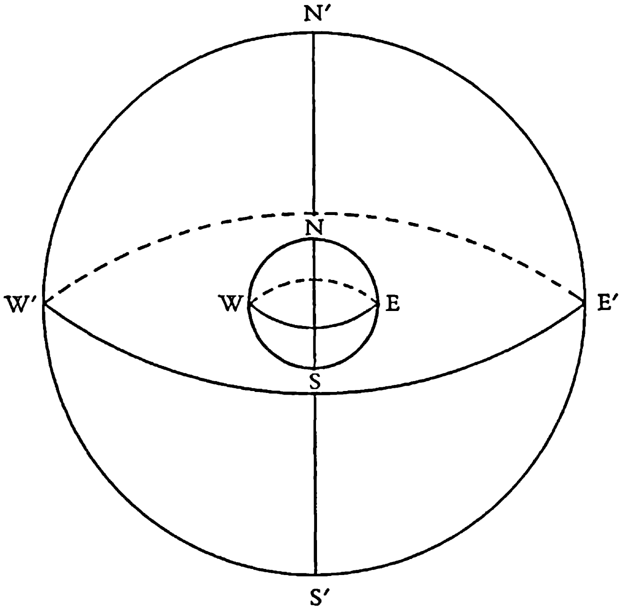

Fig. 2. The Celestial Sphere

As the earth revolves around the sun, in reality it moves, but because of the earth's rotation on its own axis, the sun appears to move in a direction from East to West, rising in the East and setting in the West. So too, the stars appear to rise in the East and set in the West. Now, as the earth moves around the sun to complete one orbit each year, the sun is seen in a different position with regard to the background of stars, and each day appears to have moved a bit. In a year, the sun appears to have made a complete circle around the celestial sphere, and this apparent circle, generated by the real motion of the earth, is called the ecliptic. Figure 3 shows the ecliptic. With the earth at a, the sun appears to be at a′, and with the earth at b, the sun seems to have moved to b′.

The celestial sphere, like any sphere, may be divided by *great circles*, i.e., circles which, *inter alia*, divide the sphere into equal hemispheres, have centers located at the center of the sphere, and are infinite in number. The celestial equator is such a great circle, and so too is the ecliptic. Now the ecliptic is not in the same plane as the celestial equator. Because the celestial equator is the extension of the earth's equator, and because the earth's axis is tilted approximately 23½° with reference to the plane of the earth's revolution about the sun, there is an angle of 23½° between the celestial equator and the ecliptic. Since the ecliptic is the representation of the sun's apparent motion, it is represented on the celestial sphere with that 23 ½° tilt, Figure 4. Half of the ecliptic falls in the Northern Hemisphere, when the sun appears to be north of the celestial equator, and half falls in the Southern Hemisphere, when the sun is south of the celestial equator. The point at which the ecliptic crosses the equator with the sun going North is called the *Vernal Equinox*, and that at which it crosses the equator again, going South, is called the *Autumnal Equinox.*

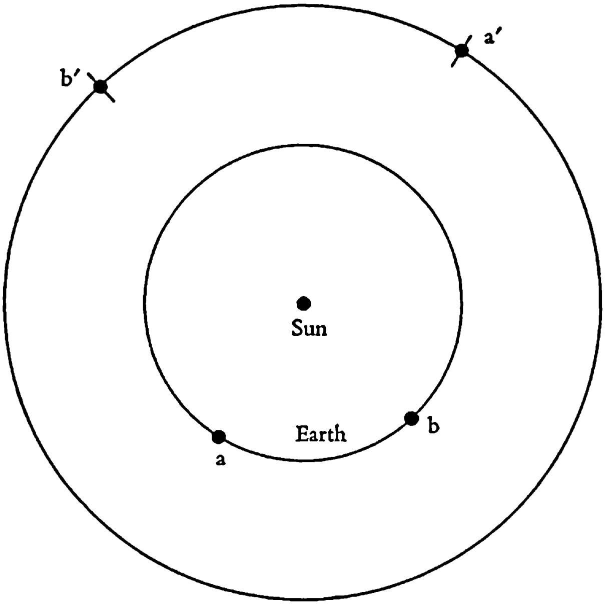

Fig. 3. The Ecliptic

Now when the sun is north of the equator, the Northern Hemisphere receive, more heat on the average each day because (a) sunshine lasts more than half the days and (b) with the altitude of the sun higher, the sun's rays strike more directly and more heat is transmitted per square inch than when the rays, striking more obliquely, disperse the given amount of heat over more surface. This phenomenon is the most influential in creating the seasons, and the seasons change and return sequentially with the passage of the sun along the ecliptic, so that with a complete passage of the sun along the ecliptic, a seasonal cycle is completed. A *solar year* is a passage of time controlled by the passage of the sun along the ecliptic, and such a year may be defined in a number of ways.

Years

The year of calendars, chronology, and civil reckoning is the year which reflects the seasons, and since the seasons depend upon the sun's place on the ecliptic with references to the equinoxes, a solar year for civil calendar reckoning is the period between two successive crossings of the sun at the vernal equinox. This year is called the *tropical year* and its real length is $365^d\ 5^h\ 48^m\ 46^s.0$ of mean solar time.[1]

A second year of the sun is the *sidereal year*, that is, the interval which it takes the sun to complete a passage along the ecliptic from one star back to the same star. This sidereal year of $365^d\ 6^h\ 9^m\ 9^s.5$ of mean solar time is also the period of the actual completion by the earth of one revolution around the sun. That the tropical year is shorter that the sidereal year by about 20 minutes is clear; it is shorter because the equinox moves slowly to the West by about 50″ of arc, per year, (precession of the equinoxes) and so the sun has a slightly shorter circuit to traverse in returning to the vernal equinox than it has in returning to the same star.

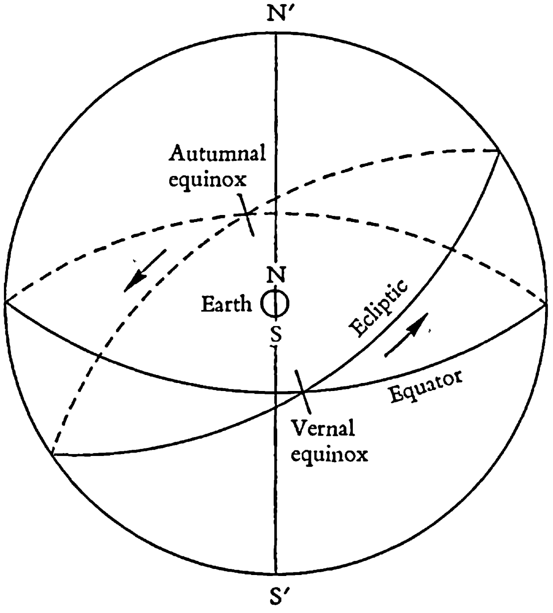

Fig. 4. The Inclination of the Ecliptic

As the earth revolves around the sun (creating the apparent passage of the sun along the ecliptic), the moon in its turn revolves around the earth. The moon's orbit around the earth is an ellipse of eccentricity considerably greater than that of the earth's orbit around the sun, and the path, although variable, is never more than about 5° 8′ from the ecliptic. The intervals of lunar travel, like those of solar travel, are measured by *conjunctions*, that is, moments when the earth, the moon, and some other body are in a line. The most important of these occasions for calendar purposes is conjunction with the sun, often simply called conjunction.

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[1] Because the sun's motion is not uniform, apparent solar time, as seen on a sundial, varies, so that to provide an invariable time unit, a fictitious sun, with uniform motion, is imagined.

Months

The moon travels around the earth and back to the same place, i.e., with reference to a star, on the average in 27.32166 days, a *sidereal month*, but this interval may vary by as much as seven hours, for reasons to be considered shortly. However, in the 27⅓ days during which the moon is making a complete circuit of the ecliptic, the earth itself is moving with reference to the sun, so that when the moon gets back to its place in a sidereal month, it will be in a difference position with regard to the line earth-moon-sun. Because of the passage of the sun along the ecliptic, it takes the moon about two days longer than the sidereal month to catch up with the sun again for conjunction. This may be seen in Figure 5.

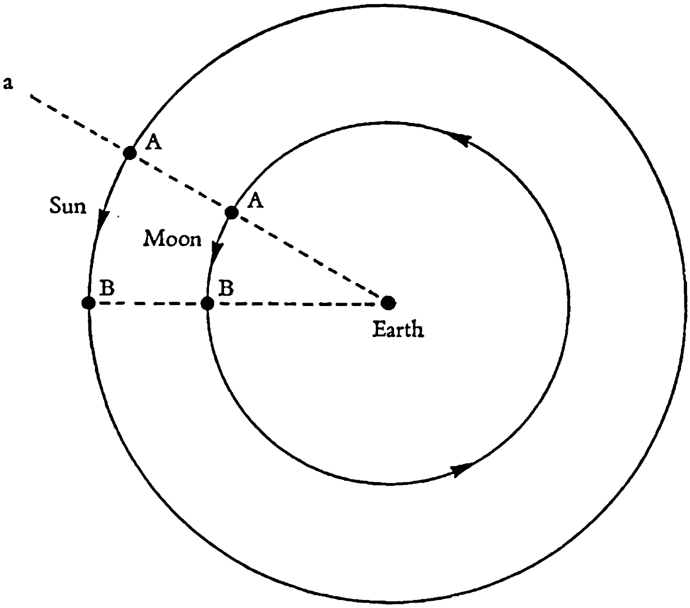

Fig. 5. At A the sun and moon are in conjunction, and when the moon has returned to A on the ecliptic to line up with star a, a sidereal months has elapsed. But by this time the sun has moved to B, and the moon must travel about two days' time to come to conjunction with the sun again

The interval between two conjunctions is called the *synodic month,* and this is the month of calendars. The synodic month is, on the average, 29.53059 days long, but it may vary by almost thirteen hours.

The Synodic Month

The variation in the length of the synodic month is caused primarily by the eccentricity of the orbits of earth and moon. Since a satellite travels most quickly when it is nearest its primary body, the moon will move most rapidly when it is at its nearest point to the earth, *perigee*, and most slowly at its greatest distance, *apogee*. At the same time, the earth-moon system varies in its distance from the sun because of the eccentricity of the earth's orbit, and the nearness or distance of the earth from the sun

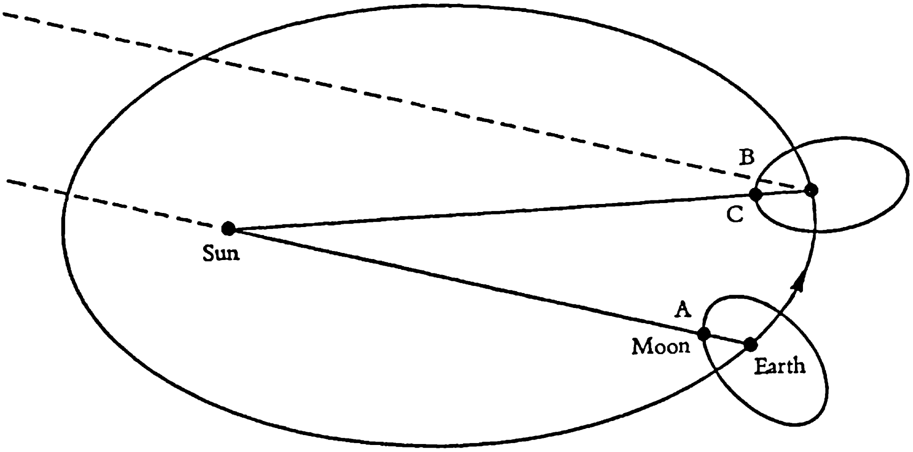

Fig. 6a. Earth at aphelion, moon at perigee at conjunction. Conjunction (and beginning of sidereal and synodic months) at A. Sidereal month completed at B, the duration until completion of synodic month is the distance B–C

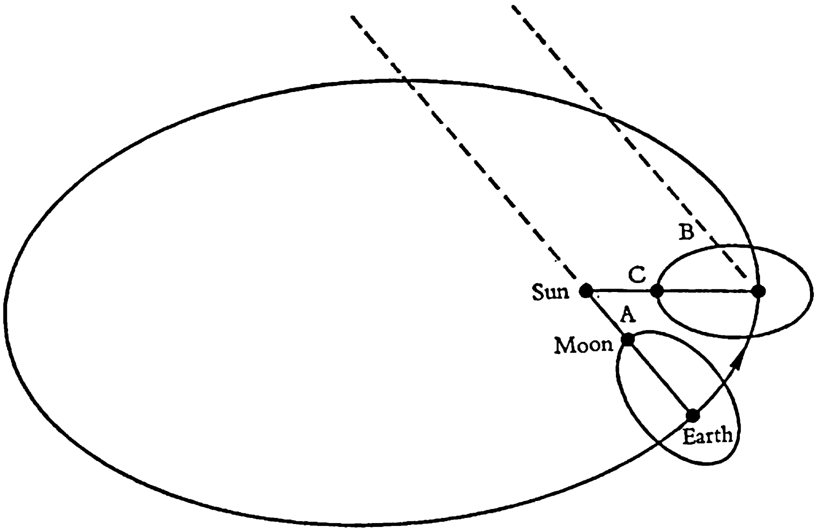

Fig. 6b. Earth at perihelion, moon at apogee at conjunction. Conjunction (and beginning of sidereal and synodic months) at A. Sidereal month completed at B, the duration until completion of synodic month is the distance B–C

affects the length of the synodic month. When the earth is at its greatest distance from the sun, *aphelion*, and the moon is at perigee, the moon travels fastest. When the earth is closest to the sun, *perihelion*, and the moon is at apogee, the moon travels slowest. At the same time, when the earth is at aphelion, the moon will have less distance to travel from the completion of a sidereal month to the completion of a synodic month, and conversely, will have more distance to travel when the earth is at perihelion. This factor compounds the speed factor, and is mainly responsible for the fact that the synodic month may be as short as 29. 26 days and as long as 29.80 days. The extreme possibilities are represented by Figure 6.

Since, however, the phenomena are not in phase, i.e., the moon is not always at perigee when the earth is at aphelion, the possible combination of factors varies enormously, thus creating a similar variety in the length of the synodic month. The prediction of the precise length of a synodic month depends upon knowledge of earth and moon positions and velocities with reference to their orbits.

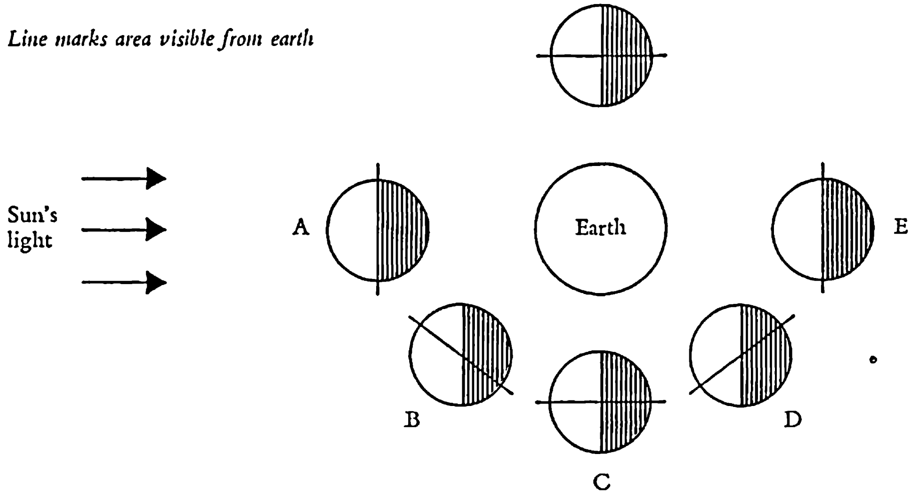

Fig. 7a. The Moon as Illuminated by the Sun

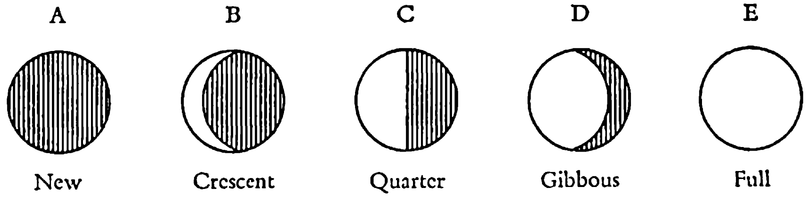

Fig. 7b. Phases of the Moon as Seen from the Earth

The moon is illuminated by the sun's light striking its surface. As the angular distance of the moon from the sun, *elongation,* changes, more or less of the moon's surface will be illuminated, and the different phases of illumination are the *phases of the moon.* When the moon is at conjunction the difference is zero, and as the light from the sun is striking the side of the moon turned away from the earth, the moon cannot be seen, and is said to be at *new moon.* One-quarter of the way through the synodic month, one-half the surface may be seen, and the moon is said to be at *first-quarter.* When the moon has revolved 180° degrees and is facing the sun, the whole part facing the earth is illuminated, and we have *full moon*. Three-quarters of the way around, we have *last quarter*, and the appearance of the moon between the quarters and full moon is called the *gibbous* moon. See Fig. 7.

Conjunction, beginning the synodic month, may occur at any time of the day or night. If occurs during the daylight hours the moon would naturally be invisible, but even if it occurs at night, conjunction itself would not be visible as the moon would be completely dark. The moon first becomes visible in the evening when it has moved far enough away from the line of conjunction for a bit of it to receive illumination from the sun and be visible from the earth. This first visible area appears from the earth as a thin crescent, and this first crescent appearance after conjunction is called *first visibility of the crescent*, new crescent visibility, or some such thing. The period of time which must elapse between conjunction and first visibility of the crescent is affected by three factors.

The first factor is the distance of the moon from the earth, called the *anomaly* of the moon. When the moon is at apogee, it travels less quickly than when it is closer to the earth, and thus traverses a smaller section of arc in a period, let us say, 24 hours, than it would when closer. At the same time, because it is farther from the earth, the angle between earth, moon, and sun would be smaller even were the section of arc the same. Because the section of arc is smaller at apogee than at perigee, and because the moon travels more slowly at apogee than at perigee, the two effects are compounded, and work together to cause a longer time to elapse between conjunction and first visibility at apogee than at perigee, as illustrated in figure 8.

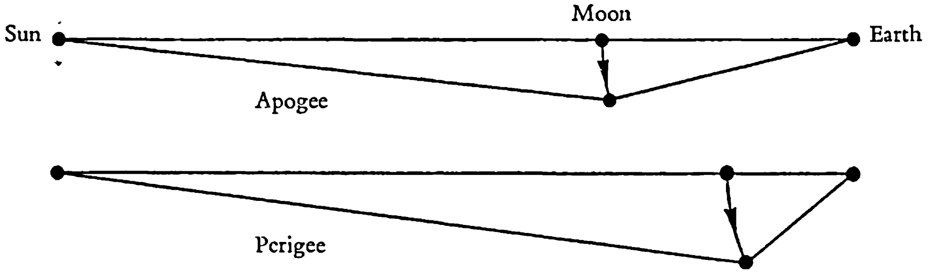

Fig. 8. Effect of the Anomaly of the Moon

The second factor affecting the interval between conjunction is the *obliquity* of the ecliptic – the angle which the ecliptic makes with the celestial equator. At the vernal equinox, the sun moves north of the celestial equator, and so the ecliptic crosses into the Northern Hemisphere. Now, when an observer on the Northern Hemisphere looks at the western horizon at the time of sunset-moonrise, the straight line of the horizon would make an angle with the celestial equator, and since the ecliptic makes an angle with the celestial equator it will be at an angle with the horizon, and that angle will be greater or smaller depending upon whether the ecliptic is north or south of the celestial equator. At the vernal equinox, when the ecliptic is nearer the vertical, the moon drops back along the ecliptic, rising in the sky, and the sun moves along the ecliptic, setting below the horizen, more quickly in a given amount of time than these phenomena occur at the autumn equinox, when the angle between ecliptic and horizon is smaller and the motion of the two bodies is more lateral than vertical. See figures 9a and 9b. The rising and setting is caused by the earth's rotation, represented by the differing positions of the horizon in the figures.

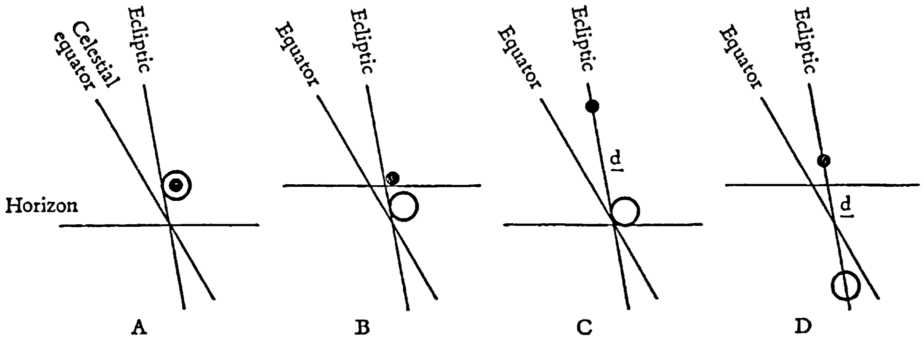

Fig. 9a. Vernal Equinox – In A, conjunction occurs just before sunset. B shows the bodies a few minutes later just after sunset. They have separated and moved along the ecliptic, but the moon is still too low with respect to the horizen to be seen, and itself will set just after the sun does. C shows the situation 24 hours later, again just before sunset, and here, the moon has fallen behind the sun distance d̲ along the ecliptic. D shows the bodies just a few minutes later. The vertical distance d̲ is great enough for the sun to get below the horizon before the moon sets, and so the moon will be seen.

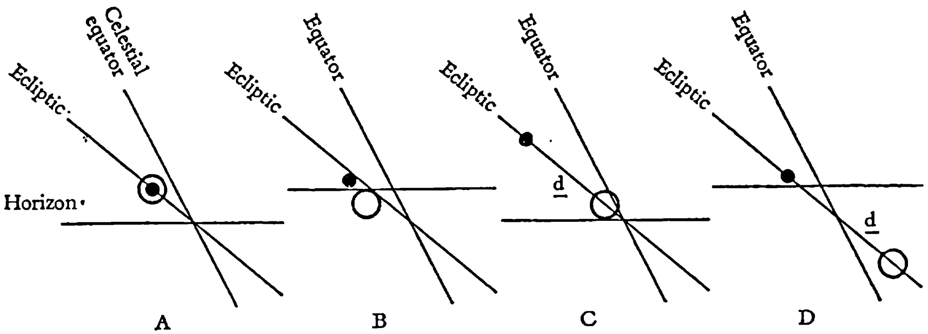

Fig. 9b. Autumn Equinox – In A and B, with conjunction at sunset, the moon is still invisible after sunset. In C, the moon has fallen behind the sun on the ecliptic the same distance d̲ as that in the vernal equinox, but it is lower on the horizon because the ecliptic is south of the celestial equator. Thus at D, it is too low on the horizon to be seen right after sunset, and it will set before the darkening skies permit it to be seen.

The third factor which affects the interval between conjunction and first visibility of the crescent is the *latitude of the moon,* that is, its distance north or south of the ecliptic. The latitude may vary by a little over 10 degrees, from 5° 8′ N to 5° 8′ S on the average. The latitude has relatively little effect at the vernal equinox, since, with the ecliptic inclined to the horizon at a great angle, the moon is high in the sky whether north or south. But at the autumnal equinox, when the ecliptic is closer to the horizontal, the latitude may be very significant, since a southern latitude may make it impossible for the moon to be seen, while a northern latitude may ensure that it can be seen after sunset. See figures 10a and 10b.

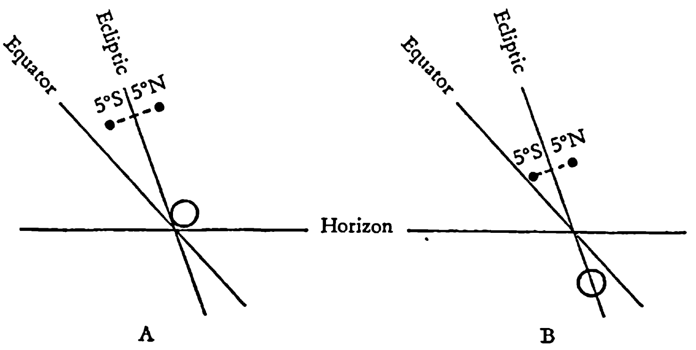

Fig. 10a. Vernal Equinox – A shows the sun at sunset, 24 hours after conjunction, with two positions of the moon, 5° N and 5° S. A few minutes later, B, it would be possible to see moon regardless of latitude

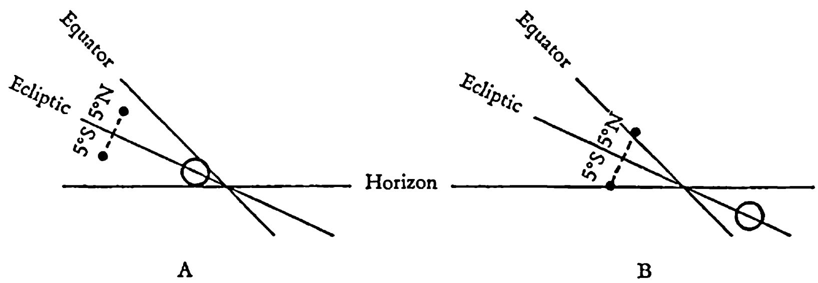

Fig. 10b. Autumnal Equinox – A again shows the situation at sunset 24 hours after conjunction with the alternate latitudes of the moon. A few minutes later, at B, it would be possible to see the moon if her latitude were 5° N, but if she were 5° S, she would already have set

In addition to these three factors generated by the motions of the celestial bodies, the visibility of the crescent is affected by the earth latitude of the observer. The more northerly the latitude, the lower will be the celestial equator. Consequently, the ecliptic will be lower, the angle of the ecliptic with the horizon will be smaller, and the vertical distance between sun and moon will be smaller at any given time than would be the case at a lower northern latitude.

2. *The Construction of Calendars*

There are three natural intervals which enter into the making of calendars, the tropical year, the synodic month, and the day. These are not quite compatible with each other, so that the tropical year is not made up of an even number of synodic months or of days, and the synodic month is made up of an uneven number of days. The tropical year has $365^d\ 5^h\ 48^m\ 46^s$ of mean solar time, or, in round figures, a little under 365¼ days. The average length of the synodic month is $29^d\ 12^h\ 44^m\ 2^s.78$, a little over 29½ days, but may vary from that average by almost thirteen hours. The day itself for calendar purposes is an constant unit, a cycle of day and night, and we today work with a length of 24 hours of mean solar time for the day.

It is clear from these figures that it is not possible to make up a synodic month from a constant number of days, nor a tropical year from a whole number of synodic months, nor indeed, even of days. A calendar is a device for applying manipulation to the counting of months and years in order to provide some standard for recording the passing of time and for designating days and months by agreed terminology.

Lunar Calendars

After the day, the synodic month, hereafter called lunar month, is the most obvious of the natural divisions of time. The moon may be seen daily going through its phases, and a cycle is completed in 29–30 days. The lunar month is a more convenient unit of time than the tropical year, since it is much shorter, and because its beginning and end is much more obvious and easily determinable with precision. However, lunar months are markedly incompatible with the tropical year. The number of whole lunar months which brings us closest to the 365¼ days which makes up a tropical year is 12 months, but 12 lunar months make up, on the average, only 354 days (12 × 29.5). This is a little over 11 days too few, and the effect of using repeating cycles of 12 lunar months will be to bring a given day in a given month 11 days earlier, with respect to the tropical year, in each cycle. Thus in the time it takes for a man to grow to maturity, the calendar will have slipped so markedly that months which came in the summer in a man's childhood will come in the winter when he is a mature man.

Such rapid change in the seasonal quality of months is extremely awkward, and cannot easily be tolerated. It ruins religious celebrations, shifting harvest festival into the time of sowing for example, disrupting any religious observations which are connected with seasonal phenomena. Therefore, there is almost always some attempt to adjust the cycle of lunar months to the tropical year; this has not only the advantage of creating a calendar which is fairly stable with regard to the seasons, but also creates, in a sense, a "countable" year, which is much more useful for the marking of the passing of long intervals of time, since a "year" marks the passing of a cycle of seasons, rather than one revolution of the moon. The adjustment of the cycle of lunar months to the tropical year can be accomplished by a calendaric technique called *intercalation*, that is, the insertion into a cycle of a certain number of extra units, in this case, the insertion into a calendar year of an extra lunar month. This intercalation must be carried over a period of years. For example, in two cycles of lunar months there are about 708 days, as against about 730 days in two tropical years. If an extra month of 30 days be inserted into the lunar calendar cycle, that cycle has 738 days as against the 730 days of the tropical year, so that in 2 years it will be 8 days longer. If another year passes without intercalation in the lunar cycle, the total of days for the three cycles becomes 1092 days, as against 1095 which will have passed in three tropical years, so that the lunar cycle has now fallen behind the tropical years by the small number of 3 days. Elaborate intercalation cycles can and have been devised to keep this variation between lunar cycle and tropical year to a minimum,[1] and to prevent the lunar months from changing seasons. Such calendars, which maintain months of the length of synodic months and which keep to the true phases of the moon, adjusting the intercalation to preserve accord between the months and the seasons of the tropical year, are often called *luni-solar calendars*, although lunar calendar is an adequate term.

Solar Calendars

In a solar calendar, the only natural units of time are the day and the year. The month, if it is used, is a arbitrary number of days and has no relation to the phases of the moon, and the year is brought as closely to the tropical year as possible. Thus the only problem in the construction of a solar calendar is that generated by the fact that a tropical year is not made up of a whole number of days, but is about 365¼ days long. If the calendar year is only 365 days, it is one day short with respect to the seasons every four years, and thus every four years a given calendar day will fall one day earlier in the tropical year. This incompatability is not extremely serious in one lifetime, since in 60 years, dates will be only 15 days earlier with respect to the seasons. The discrepancy accumulating slowly might not be noticable, unless the relationships were also matched against the stars. Over a long period, however, the discrepancy would be more serious. After the passage of 1,460 years (365 × 4) the months will have made a complete revolution with regard to the seasons; in a period of 730 years, winter months will move to the summer and vice versa. By Hellenistic times attempts were being made to control this revolution, and the modern calendar is a refined version of the julian calendar (q.v.) introduced by Julius Caesar.

In the modern calendar, the months are simply arbitrary intervals of time. Their lengths are constant and predictable, and there is no accord between beginnings and lengths of months and the beginnings and durations of synodic months. The only calendar manipulation is the treatment of the ¼ day, by which the tropical year is longer than an even number of days in a calendar year. The julian reform attempted to make the calendar year a true tropical year, and introduced the insertion of one extra day every four years, to bring the years to 365¼ days on the average. However, since the tropical year is not precisely $365^d\ 6^h$, but $365^d\ 5^h\ 48^m\ 46^s$, this julian year with a 'leap year day' every four years is $11^m\ 14^s$ too long. The error amounts to a little over 3 days per 400 years, advancing the julian year with relation to the seasons and the equinox. By 1582 A.D. ten days of error had accumulated, and at that time Pope Gregory, retarding the calendar by 10 days to bring the year back to its position with regard to the equinox, introduced a further reform to prevent the error from accumulating in the future. The julian system provided for a leap day in each year divisible by four; Gregory continued this, with the proviso that only century years divisible by 400 should be leap-years, thus eliminating the three excess days every 400 years. This correction brings the gregorian year to a length of $365^d\ 5^h\ 49^m\ 12^s$ which is only 26 seconds longer than the true tropical year. (This error amounts to a day in 3323, a problem which will cause few to lose sleep; the error can be reduced further by omitting intercalation in the year 4000, and all its multiples, and the reader is urged to effect this when the time comes.)

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[1] As has been noted, the tropical year is an uneven number of days, 365¼, and this affects a lunar calendar in its relationship to the tropical year. But as the primary unit of time is the month, not the year, this factor is not so prominent or taken directly into account as it must be in a solar calendar, q.v.

3. Natural Units of Time

In the making of calendars, whether lunar or solar, the determination of the natural units is a precondition of the creation of any system which is to be workable. There must be agreement on the phenomena which begin and end the units, and these phenomena must be recurrent and easily recognizable. They may be interdependent, i.e., the choice for the beginning of the day will usually control the time of day for the beginning of the month. The matter is one of some difficulty, as there are a number of natural phenomena which are suitable for use as terminal points, and different calendars have used different terminal points for days, months, and years.

The Day

The nature of the day is obvious: it is a period which includes a complete period of daylight and a complete period of night. For calendar purposes, however, it is necessary to select a specific point in the period for the change of date. Modern civil calendars use midnight as the beginning of a calendar date, and with the availability of clocks, that is perfectly workable. Modern astronomical calendars use noon for the beginning of the calendar date, and that too is a perfectly satisfactory point.

In antiquity, however, observation of the sun was much more often used to determine the beginning of the date on the calendar. In general, Greek calendar dates began in the evening with the setting of the sun, as did, and still do, the Moslem and Hebrew calendar dates. The Egyptian date began in the morning at sunrise, while the Roman calendar used midnight for the beginning of the date.

The Month

The phases of the moon are the most useful phenomena to determine the beginnings and endings of months, when the calendar month is intended to be truly lunar, and these phases do indeed seem to provide these termini. Although conjunction is the true beginning of the month, it, being invisible, is not very useful as the beginning point of the month in an observed lunar calendar, i.e., one in which the visible phases provide the points of demarcation. The most common termination/beginning point is the first visibility of the crescent in the evening; on observation of the crescent, the old month is deemed to have ended and the new month to have begun. So far as we can determine, all Greek calendars used first visibility of the crescent, as did, *inter alia*, Babylonian, Hebrew, and Moslem calendars.

It is also possible to determine the beginning of the month by observation of last visibility of the crescent in the morning. Just as at the beginning of the month the crescent is visible over the horizon in the evening, and as the month progresses the crescent grows fatter and remains in the sky longer, so, at the end of the month the reverse phenomenon occurs. As the month draws to a close the crescent is visible before sunrise, and it grows thinner and thinner and remains in the sky for a decreasing length of time. There will finally come a day when it will not appear at all, and it will then begin again the cycle in which the moon as crescent appears briefly in the evening, grows larger and shines longer through the night, and finally again appears as the last crescent just for a few minutes before sunrise at the end of the month. It is therefore possible to use this first morning of invisibility as the beginning of the month, and one form of Egyptian calendar seems to have done so. The Egyptians had, in addition to the 365 day solar calendar a religious lunar calendar, and that calendar, in which the months followed the moon, began those months on the morning in which the moon could not be seen any longer.[1]

In lunar calendars then, months are determined by observation of the phases of the moon, and a month is that interval between two successive observations of the same phenomenon. While in those calendars in which the month is not tied to the moon the month can be and is a set and constant number of days, lengths of months in lunar calendars must fluctuate in length with the actual length of the synodic month, and that fluctuation is determined by the observable phases.

However, with the true synodic month an average of about 29½ days (± 13 hours), a lunar month *can never* be shorter than 29 days nor longer than 30 days, so that the fluctuation will be over a very limited range. Experience of this fact is soon impressed upon any people dealing with lunar calendars, and this fact of nature will place some limits on the applicability of observation in the operation of lunar calendars for civil purposes.[2] If on the evening which ends the 29th day the moon is not seen, either because in fact it is not visible for astronomical reasons or because visibility is obscured by atmospheric conditions, that month can without difficulty be given another day to become a 30 day month. But if atmospheric conditions obscure the moon on the evening of the 30th day, experience will dictate that the month should begin anyway. The maximum dislocation causable by poor visibility would thus be one day; that is if the moon were actually in first crescent on the evening of the 29th day, but was not seen due to atmospheric conditions so that the month was not begun until the next day, the calendar month would be one day longer, and the next month one day behind the true observation month. This could have the effect of shortening the month by 1 day. If a (true) 29 day month were considered a 30 day month, and the next month were a true 29 day month, the first crescent visibility to begin the following, third, month, would actually be visible on the evening of the 28th day thus shortening the month by one day. This discussion may be summed up as follows:

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[1] R. A. Parker, *The Calendars of Ancient Egypt*, Studies in Ancient Oriental Civilization, Chicago, 1950, pp. 9–23.

[2] Elaborate rules for verification of observation, as those set by Talmudic law, are not commonly found in Graeco-Roman areas.

a) Poor visibility may cause a calendar month to be longer or shorter than an observation month, by a maximum of one day, *but*

b) visibility conditions can only delay the start of a calendar month, causing it to be behind an observation month, and never can accelerate the beginning of a calendar month ahead of observation.

So far we have been dealing with months determined purely by observation, allowing only for the factor of visibility. In calendars in which the month is determined by observation there is relatively little opportunity for prediction of the length of the month, at least at the beginning of the month. Since the length of the synodic month varies, and because there is also variance in the time required for visibility of the crescent, it is possible and often happens that there will be two 29 day months or two 30 days months in succession. Longer sequences are rarer: it is possible to have three 29 day months in a row, as it is possible to have three 30 day months, or, less frequently four, or, most rarely, five 30 day months in a row. Experience will build up this information. People will know that three 29 day months must be followed by a 30 day month, as five 30 day months will certainly, and four probably, will be followed by a 29 day month.

There are methods apart from strict observation by which months in a lunar calendar may be kept in close conformity with the actual phases of the moon. The method available in antiquity was that of the use of cycles. A number of such cycles, based on a principle of dropping the requisite number of days from 30 day months, either by a predetermined scheme or by means of parapegmata, were in use by Hellenistic times. Although no such use of cycles can be demonstrated for Greek calendars, they were used by Greek astronomers, and in Egypt at least, a 25 year cycle was used to set the lengths of months in the Macedonian calendar in use there during Ptolemaic times.

The Year

The natural year, as we have noted in our discussion of the astronomical phenomena, is the year of the seasons, the tropical year of a little under 365¼ days. As we have seen further (Solar Calendars, p. 12) the adaptation of the tropical year to calendars involves refinements of a quadrennial intercalation of a leap-year day. Lunar calendars (q.v.) can be roughly adapted to the tropical year, with lunar years being made at some times slightly longer, at other times shorter, than tropical years by cyclical intercalations of lunar months, but lunar calendar years can never correspond to tropical years as well as years in solar calendars.

There is, therefore, little difficulty in establishing the nature of the year as a natural unit. 365 days is very close to the actual length of the tropical year, and very simple intercalation comes extremely close to establishing a permanent accord, and all calendars, ancient or modern, which attempt to do this, will be similar or identical in the lengths assigned to years. There is, however, great variety in the number of possible starting points. While for natural (lunar) months, there are really only two convenient starting points, first visibility of the crescent in the evening and the day of invisibility of the crescent in the morning, there is a great multitude of possible beginnings for the year. These may be gathered under two broad categories, (1) arbitrary beginning points, and (2) natural beginning points. Most true solar calendar years seem to have arbitrary beginning points, although there is some evidence for some effort to have natural beginning points in some calendars. Most lunar calendars seem to rely on natural beginning points for the year, even when serious attempt is made to keep the lunar years as close to tropical years as possible.

1. The modern calendar is the best example of a year beginning with an arbitrary point. The year begins on January 1. This date is associated with no natural phenomenon, and the year begins on that date because of historical accident: the Roman (julian) calendar began with that date, and that practice passed into tradition. With the recurrence of January 1, each year begins, and this is the case also in leap-years. Although the leap-year is lengthened by one day (February 29) this has no effect on the beginning of the next year. The year comes to an end when the calendar date 31 December ends and January 1 begins. That happens at midnight of December 31, a point determined not by natural, but by mechanical measurement. In antiquity many calendars operated this way, beginning the year by calendar anniversaries. For examples, see the Later Roman Calendar, January 1, The Egyptian Civil Calendar, Thoth 1, and the various New Year's days in the different calendars of the Eastern Roman Provinces, (pp. 171–187). In calendars of this sort, in which New Year's day is set purely by calendaric recurrence, New Year's day is usually the first of some month. The month chosen is based usually on some traditional practice, and any month will do. New Year's day has no effect on the length of the year, and the lengths of years are easily predictable.

Related to arbitrary calendaric anniversary systems, but slightly different, are systems which may be termed "non-calendaric anniversary arbitrary systems". These are systems in which the year begins on some date set as an anniversary external to the calendar, e.g., the anniversary af a king's accession or birth, or a similar anniversary for some former ruler. A number of calendars seem to have operated with regnal years, and in the Macedonian calendar in Egypt, for example, the date of the king's accession marked the beginning of the regnal, and therefore official, calendar year, and the year changed with the recurrence of that date. In such a system, the beginning of the calendar year may change from ruler to ruler. There were also calendars which began the year on the anniversary date of some date in the past. Augustus' birthday was a favorite date for beginning the year in the Eastern Roman Provinces (q.v.), and places like Smyrna and Ephesus began the year on that date, September 23; even though in their own calendars the month name was not September, on the local equivalent of September 23 the year changed.

2. For calendars which began the year at or near the time of some astronomical phenomenon, the solstices were particularly attractive. The summer solstice, halfway between spring and autumn equinoxes, or the winter solstice, halfway between autumn and spring equinoxes, marking the points at which the sun reaches the greatest angle above (summer) or below (winter) the celestial equator, were often used as the astronomical determinants for beginning the year. They were particularly useful for this, as the occurence of the solstice can be determined simply by observation of the sun, without calculation and without reference to any other celestial body. By observing positions of the sun at sunrise or sunset, or by observing lengths of shadows, minimum and maximum lengths occurring at the time of the solstices, the date of the solstice can be discovered with accuracy. The operators of lunar calendars which were to begin after the one or other solstice need only observe the solstice, and begin the next year with the beginning of the following month.

It will be readily apparent that, in a calendar which uses a lunar-solar year of this type, with the beginning of the year controlled by advent of a phenomenon tied to the tropical year as is the solstice, such a phenomenon can be used to give advance warning of the necessary intercalation of a month. For, in a year which begins with the first new moon after the summer solstice, the winter solstice should be observable in the middle of the year. If the eighth month begins before the winter solstice has been observed, that is adequate notice that an intercalary month is necessary in order to prolong the lunar year so that the next year will begin after the summer solstice. Alternatively, it is possible to use the rising of some star, as Arcturus in the fall, as an indicator that the lunar year needs prolonging. The use of a star would make it possible to determine intercalation very early in the year.

The Week

The week is not really a natural unit of time, except insofar as the 7-day week is a very rough approximate to the periodisation of the moon. However, inasmuch as the synodic month is approximately 29½ days, four weeks making up 28 days is quite short of the synodic month, and therefore within a very short time weeks will be startlingly out of accord with the phases of the moon. The week could never have been a natural calendar unit of time, and it is no surprise that there is no evidence of any attempt to keep weeks in accord with the moon. From the earliest, the week must have been simply a convenient short unit of time.

Weeks are not part of the Graeco-Roman calendaric tradition. They are not attested until quite late in Greek or Latin sources, and there is no doubt that the tradition of the week finds its origin in Hebrew practice. It is well attested in the Bible, e.g., Genesis 29.27, and in the Biblical tradition the days of the week were simply numbered. As the week became known in the Western Mediterranean it had no direct effect on the operation of calendars, but in the common usage there grew up the practice of naming the days of the week after planets. This is attested as early as the end of the first century B.C. by Tibullus' reference (I, 3, 18) to "Saturniue sacram... diem," and first century inscriptions at Pompeii list "the days of the gods".[1] By the third century the planetary week was broadly known, as we learn from Dio Cassius (XXXVII, 18), who, while correctly telling us that the ancient Greeks did not know of it, misinforms us that the Egyptians invented it. While the Hebrew practice of simply numbering the days persisted in the Greek East and entered the practice of the Greek Church, the planetary days persisted in Western Europe.

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[1] Planet	Θεῶν ἡμέραι	Dies	
Saturn	Κρόνου	Saturni	Saturday
Sun	Ἡλίου	Solis	Sunday
Moon	Σελήνης	Lunae	Monday
Mars	Ἄρεως	Martis	Tuesday
Mercury	Ἕρμου	Mercurii	Wednesday
Jupiter	Διός	Jovis	Thursday
Venus	Ἀφροδείτης	Veneris	Friday

CHAPTER II

GREEK ASTRONOMICAL CALENDARS

By the middle of the first millenium B.C., Greek men of science were observing the earth and the heavens, and coming to conclusions about the structure of the universe. The observations made possible a compilation of a great deal of data about the intervals between observable phenomena, and Greek astronomers made attempts to construct calendaric systems which took into account the true intervals of natural time. Their results were impressive, particularly to later (ancient) synthesizers, and we have a number of reports of cycles devised as early as the fifth century B.C. In dealing with these, a number of serious warnings should preface any discussion of the material.

In the first place, it should be a fundamental principle that we may not prejudge the applicability of any astronomical systems to civil practice. There has never been the danger that scholars would assume that astronomical calendars had no applicability to civil practice, but the history of calendaric studies has been replete with the enthusiastic adoption of assumptions permitting the equation of an astronomical cycle to a civil calendar. The temptation is great, because, if an attested astronomical cycle can explain the workings of a civil calendar, we have the possibility of the reconstruction entire of that civil calendar, along with the possibility of deriving julian dates from it. It is fair to say that, because the equation of an astronomical calendar to a civil one has such broad implications, we should be most reluctant to do it unless we proceed from evidence. That such an equation could have existed we may assume; that a specific astronomical calendar controlled a specific civil calendar we may not assume. The demonstration of congruence must rest upon an examination of the workings of both astronomical and civil calendars, and a convincing argument would show that (a) the structure of the civil calendar always fitted the structure of the astronomical cycle, and (b) that the structure of the civil calendar cannot be explained purely by observation. The latter requirement is the more difficult, because the astronomical calendars always were fairly close to the phenomena. However, because the astronomical cycles were based upon theory, and aimed at a general overall congruence of the cycle with the phenomena, cycles were not always in precise accord with the phenomena, and in lunar cycles particularly, months occasionally began before visibility would have been possible. In such cases, if a calendar so began, it would be possible to demonstrate dependence upon a cycle. Such a demonstration obviously depends upon the availability of data in great quantity, data rarely offered in such quantity by our sources, so that, for the most part, the best that we can usually do is argue a negative.

But the astronomical calendars were important, even if they did not control civil calendars. The growth of astronomical and calendaric knowledge influenced the developments of calendars, and eventually, indeed, did result in the adaptation of solar calendars at least, to allow for the true length of the tropical year. But calendars existed a long time before astronomical information had been accumulated, and the forces of tradition prevented the ready conversion of civil practice. The resistance of tradition is well attested in more modern times in the delay encountered in many countries after the promulgation of the gregorian reform. The new dates and new calendar were promulgated in 1582, but many countries did not adopt them. England waited until 1752, and even then there was great public opposition to the reform. Many countries, particularly those in Eastern Europe, did not adopt the gregorian calendar until the twentieth century.[1] This experience should provide a warning to those who would too readily assume that the calendars devised by astronomers were quickly adopted by laymen to improve their own calendars. While the existence of astronomical calendars might point up the deficiencies in civil calendars, and the knowledge on which the astronomical calendars were based might be used for the better manipulation of civil calendars, the actual use of the astronomical calendars might lie outside civil practice.

In the discussion which follows, I shall discuss those astronomical cycles which are attested by one or another ancient source. In order to do this successfully, I must make some reference to the state of knowledge of celestial mechanics required for the devising of the cycles, but of course, in a work which deals with calendars and not ancient science, I shall not make any attempt to reconstruct a synthesis of the history of Greek Astronomy. Rather, alluding only occasionally to ancient theories of celestial mechanics, I shall try to sketch the development of the awareness of the intervals required between recurrent astronomical events, indicating the bases of knowledge on which awareness might rest.[2]

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[1] For a full list of adoption dates, see *Explanatory Supplement to the Astronomical Ephemeris and The American Ephemeris and Nautical Almanac*, London, 1961, pp. 414–416.

[2] The statements which follow are based largely upon the conclusions of Otto Neugebauer, as expressed in *The Exact Sciences in Antiquity*, Providence, 1957, and in articles there cited. Neugebauer gives short bibliographies at the ends of chapters, and a more extensive bibliography may be compiled from G. Sarton's *A History of Science*, Ancient Science through the Golden Age of Greece, Cambridge, Mass, 1952. (Subsequent to my writing this, C. H. Kahn's „On Early Greek Astronomy" appeared in *JHS* 90, 1970, pp. 99–116. Although in part a polemic against Dicks' position [below, p. 21, note 1], Kahn's discussion is a very useful analysis of the development of early Greek Astronomy. Kahn stresses, as I do below, the base of the geometrical model for the development of Greek astronomy. I think that Kahn is right in pointing out that this model could be, and was, developed without advanced mathematical operations, but it is also worth noting for our purposes that in the period before the development of mathematics (the period Dicks calls „pre-scientific"), the insights gained through geometry could not be applied to the refinement of calendars).

1. Early Astronomical Theory

There is no evidence for scientific astronomical/calendaric theory in Greece before the fifth century B.C.[1] Thus, calendars developed and tradition solidified long before any theoretical awareness of the true intervals of the duration of years, at least, was possible. We have long lived with the cliche that the Greeks learned their astronomy from the Babylonians, but modern investigation has demonstrated that the sophisticated Babylonian systems were much later than had hitherto been believed. The irregular intercalations of the Babylonian calendar exist down into the fifth century, showing that as late as 480 B.C., no cycle existed to control that calendar, although within 100 years of that date a fixed cycle of intercalations was established. This cycle intercalated 7 months, at fixed intervals, over a period of 19 years, to keep the Babylonian lunar year in general accord with the tropical years. Because the Babylonian year was lunar, Babylonian astronomers struggled with that fundamental problem, how long should a lunar month be? The evidence we have from the later cuneiform tablets shows that the Babylonians had been able to solve the problem of the method of computing lengths of months, although we do not know the nature of the theory which lies behind the construction of the practical tools of computation. What we do have are ephemerides which give, on the scheme of linear zigzag functions, numbers which reflect lunar and solar velocity and celestial positions, and which are applicable to the computations of new moons, *inter alia*. The computation is carried on by arithmetic exclusively, and no geometric representation appears. In other words, we have a series of arithmetical progressions, which, manipulated properly, will produce predictions of phenomena like new moons. The Babylonian texts which show these sophisticated characteristics all fall in the Hellenistic period, and long postdate the first appearance of astronomically based calendars in Greece, and this has led Neugebauer to suggest that the 19 year cycle was an original Greek discovery.[2] Original or not, it is certainly wrong to suppose that Greek astronomical theory of the fifth century rested on a sophisticated, elaborated, and completed Babylonian base, which became known to Greeks of the period, and it is a kind of begging of the question to explain fifth century Greek astronomical and calendaric discoveries by positing prior Babylonian knowledge. Rather, we should be investigating the nature of *Greek* knowledge of the period in hopes of understanding the discoveries in terms of the Greek milieu in which they were made. "Babylonian influence" may be a red herring, and a much more economical hypothesis may allow us to find Greek bases for the work of Meton and his associates.

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[1] I am more comfortable with this sceptical position since the appearance of D.R. Dicks' "Solstices, Equinoxes, and The Presocratics," *JHS* 86, 1966, pp. 26–40. Dicks argues that until the fifth century – indeed, the last few decades of the fifth century – Greek astronomy was in the "pre-scientific stage." I think that this is probably right, although I suggest that the "rough-and-ready observations" (Dicks, p. 39) laid the groundwork for real science, and may be in part responsible for the eagerness of later antiquity to ascribe many discoveries to sixth century B.C. figures. See p. 20, n. 2.

[2] *Exact Sciences*, p. 140. Neugebauer argues that the 19 year cycle was first consistently attested in Babylon from about 380 B.C. on.

Sixth Century Astronomy

Of Meton I shall write further in subsequent pages. By his time a number of important discoveries had been made. Greek tradition ascribes much to Anaximander of Miletus, said by Apollodorus to have been 64 years old in Ol.58, 2 (547/6 B.C.).[1] Diogenes Laertius (II, 1–2) credits a number of discoveries to him: the earth is round; the moon shines by light reflected from the sun; the sun is not smaller than the earth; he first discovered the Gnomon[2] (according to the report of Favorinus) which marked the solstices and the equinoxes. The Suda, s.v., concurs in crediting Anaximander with discovery of the solstices, the equinoxes, and the Gnomon. Pliny also (Nat. Hist. II, 187) says that he discovered the Gnomon, and attributes to him also the discovery of the obliquity of the zodiac, i.e., the ecliptic. Some of these discoveries were attributed by Greeks to earlier figures, e.g., to Thales the credit for the discovery of the solstices[3] (and eclipses[4]) by Diogenes Laertius I, 23–24, or to later figures, like Oenopides, whom Diodorus Siculus (I, 98) credits with the discovery of the obliquity of the ecliptic.[5] It is not my purpose here to discuss the correctness of any of these attributions,[6] and it is sufficient for our purpose to note that the Greek tradition is unanimous in placing early the discovery of the Gnomon and the solstices. These, as even the most vigourous sceptic would admit,[1] can belong in the intellectual milieu of the sixth century, and these are enough to provide some objective data against which to match the passage of seasons.

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[1] Diog. Laert. II,2.

[2] That is, a stick marked with measurements, and placed vertically in a horizontal plane, rather like a sundial, so that it throws a shadow all day long. It will show, *inter alia*, a minimum shadow at real noon, and the shortest minimum at summer solstice and the longest minimum at winter solstice, and, showing extreme east-west positions at the solstices, the halfway point between these can be marked to indicate the equinoxes. That the Gnomon was not discovered by Anaximander is argued by Herodotus, II, 109, who says that the Gnomon was learned by the Greeks from the Babylonian. He may have learned of it from the Babylonians, however, and may have first introduced it to the Greek world. Or, the report which Herodotus gives may be part of the Greek tradition which so often credits astronomical and mathematical discoveries to the Babylonians.

[3] In Diog. Laert. I,23, we are told that Thales discovered the solstices, while in I, 24 are added the passage of the sun from solstice to solstice, as well as the size of the sun. Aetius (*Dox. Graec.*, p. 340) also credits the solstices, equinoxes, and the obliquity of the ecliptic to Thales.

[4] Diog. Laert. I, 23 and Hdt. I, 74. The story is probably still not dead, but see Neugebauer, *Exact Sciences*, pp. 142–3 if you want to bury it.

[5] Also credited to Oenopides by Eudemus; cf. H. Diels-W. Kranz, *Die Fragmente der Vorsokratiker*, 5th Ed. Thales A 12. For citation of fragments of the respective philosophers and the full range of ancient credits, see Diels-Kranz[5] under the various philosophers.

[6] For a fairly generous view of Anaximander's competence, see C. Kahn, *Anaximander and the Origins of Greek Cosmology*, New York, 1960. Many factors are at work in these ancient attributions, many of which are of such gibberish that it is difficult to imagine any real worth for them. There is the tendency to attribute great discoveries to great men, like Thales, and there is the tendency, even for the ancients, to credit discoveries to early figures in order to make a sensible picture of the advance of knowledge, an attitude illustrated by Sarton's treatment (p. 292) of the discovery of the obliquity of the ecliptic by Oenopides: his researches made it "possible for him really to understand the obliquity of the ecliptic, that is, to discover it."

With these sixth century discoveries, Greeks of the fifth century had at hand all the tools necessary to determine the length of the tropical year, at least in whole days. The Gnomon could be used to find the day of the solstice, and the intervals between the solstices determined. Equinoxes, and intervals between them, could have been roughly established, even if there was no understanding whatsoever of the nature of the motions of the relevant bodies. During the fifth century itself much attention was given to cosmological speculation, and, even if the theories propounded were not subject to the same kind of empirical tests which could be applied to proposals about the solstices, a great deal of valuable groundwork was laid. Proceeding from this general, and reasonably secure, conclusion into an examination of the astronomy of the fifth century, we face a multitude of problems.

The Fifth Century

The astronomy of the fifth century was carried on by philosophers, as had been the astronomy of the sixth. But, whereas we may be content with the extraction from the sixth century evidence of the pragmatic techniques developed and the discoveries made possible from those techniques, we have for the next century to deduce both (a) theories of celestial mechanics which were developed, and (b) which theories had general currency, or at least, which ones were useful to professional technical astronomers, if there were any, or to calendar theorists like Euctemon and Meton. This is hardly the place for a short and bad summary of Pre-Socratic philosophy, but we cannot proceed without the mention, at least, of some of the concepts which the very incomplete evidence suggests were at hand to the workers in the period before Meton.

In the first place, the notion of a geometrical model seems to have been current throughout the century. Although the shapes and positions of the bodies in the model

[1] Dicks, *op.cit.* p. 31, notes the difference between the solstices, which can be noted and roughly determined by simple observation, and the equinoxes, which cannot be determined by observation alone, and is willing to believe that the solstices were known to Anaximander. But, even though the equinoxes certainly cannot be determined without calculation, and require sophisticated theory to be understood, the general phenomenon of lengthening day yielding to shortening day would certainly have been observed. L. Woodbury argues (*TAPA* 97, 1966, pp. 608–609, note 26) that the equinoxes could have been roughly determined by, e.g., dividing the time between the solstices. I think that this is right, and it does not imply any real scientific activity of the sort which Dicks doubts. The lengthening and shortening of the time of day between the solstices would imply another "turn", at which point there was equality of day and night, and this could have been posited theoretically and arrived at roughly without the slightest understanding of the phenomena. See Woodbury, *op.cit.* for evidence on early reports of the equinoxes.

vary according to different conceptions of the universe, the model seems to have provided a framework for fifth-century thought. Aristotle's description of Pythagorean thought – whether early or late does not affect its utility as an example – provides an excellent illustration of the kind of structure which might be posited. Around a central fire move: counter-earth, earth, moon, sun, the five planets, and the sphere of the fixed stars.[1] The movement is circular.[2] The movement and positioning of earth and sun creates day and night.[3] This schematization, right or wrong, permits the creation of a mechanical theory which would explain observed phenomena. Although Aristotle complains that the explanation of observed phenomena was precisely what the Pythagoreans did *not* provide, the operation with a geometrical model would make possible certain modes of thought about the phenomena,[4] and the Pythagorean number theory, to be mentioned later, would have relevance to calendars.

The notion of the obliquity of the ecliptic seems to have taken hold among the Pythagoreans, as Aetius (III, 13, 1–2) attributes to Philolaus the notion that the path of the earth, like that of the sun and moon, was inclined. But perhaps most important among Pythagorean cosmological ideas was the more or less correct notion about eclipses attributed to them by Aetius, II, 29, 4: they occur because of the interposition of the earth or the counter earth. The idea seems to have been new, and was made possible only by the celestial model which the Pythagoreans developed. That model, displacing the earth from the center, was a radical one, and, as I have said, permitted conclusions about the relations of the bodies to one another that had not been possible before.[5]

We find a number of ideas held by the Pythagoreans in other writers of the fifth century. Anaxagoras[6] refers incidentally to the revolution (which he must mean by

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[1] The theory, summed up, is attributed to Philolaus (q.v.), by Aetius, II, 7, 7 (Diels, *Dox. Graec.* p. 336–7), but it is amply attested for the Pythagorean school by Aristotle, *De Caelo* B 13, 293a 18; *Metaph.* A 5, 986a 8; Simplicius, *Comm. in Arist. De Caelo* II, 12 (Heiberg p. 511). Aetius is consistent in his attribution to Philolaus: III,11,3 (*Dox. Graec.* p. 377), III, 13, 1–2 (*Dox.Graec.* p. 378).

[2] Arist. *De Caelo* B 9, 290b 18; B 13, 293a 21.

[3] Arist. *De Caelo* B 13, 293a 21; Simplicius, *De Caelo* 511,26.

[4] Dicks, *op.cit.* p. 39, stresses the importance of the Pythagorean concept of the spherical earth in the development of mathematical astronomy.

[5] As, for example, Anaximander explained eclipses by saying that the bodies show themselves at pipe-like passages, and that when these are closed, eclipses occur, (Hippolytus, *Refut.* 1,6,4–5 = Diels-Kranz^5 Anaxagoras A 42) and that this blocking also causes the phases of the moon. The term bodies here is deceptive, for, although Aetius, II, 16, 5 says that Anaximander posited heavenly bodies, each carried on its own 'wheel,' a circle or sphere on which it goes, Anaximander seems actually to be saying that the bodies appear as bodies, but meaning that the holes through which the fire is seen are what is referred to. The bodies themselves are rings of fire, and so only through the holes can they be seen. That this structure is a model is suggested by Hippolytus *Ref.* 1,6,4–5, where Anaximander is credited with that kind of thinking, that the sun ring is the highest from the earth, the stars lowest. This early celestial model may lie behind the later, but it is so fundamentally different, and, with rings rather than bodies, so divorced from reality, that it does not have the kind of applicability to phenomena which the Pythagorean idea had, witness the difference in treatment of eclipses.

[6] Diels-Kranz^5 Anaxagoras B 12.

perichoresis)[1] of the sun, moon, and stars in his discussion of *nous*, in terms that suggest that he is arguing from the familiar and accepted motion of the bodies to his own particular proposition. His cosmology in general is predicated on a model similar to that of the Pythagoreans,[2] with the stars distant from the earth, the moon below the sun and closer to earth. This same discussion explains the light of the moon as reflected from the sun,[3] recognizes that the stars go "under" the earth, and offers a similar, but more sophisticated explanation: eclipses of the moon are caused by the earth (or bodies below the moon) blocking the moon, while those of the sun are caused by the moon blocking the sun *at new moon*.

This last observation betrays the high level to which the theory of the model had been refined. Anaxagoras knew that eclipses of the sun are only possible at conjunction, i.e., new moon. This, together with his conclusion that the material of the moon was the same as that of earth, shows that he must have had in mind a model not so very different from that of his successors. Although he thought the earth was flat, and it seems that he posited a geocentric system (unlike the Pythagoreans, but like his successors) the comment about eclipses at conjunction shows that he was aware of the orbit of the moon, and that its motion brought it to a point where blocking was possible only once a month. The state of general knowledge at the end of the century of the motions of the bodies is noted by Plutarch, *Nicias* 23. In discussing the eclipse of the moon which so frightened Nicias and his troops, Plutarch noted that eclipses of the sun were pretty well understood by all as caused by the moon, but that eclipses of the moon were not; Anaxagoras, Plutarch goes on, had only recently given the explanation, and it was not generally known or even much publicized.[4] All this is rather interesting, and certainly gives us a good insight into common knowledge as contrasted with refined investigation, and makes it possible to see what notions can be regarded as generally accepted. That most people understood eclipses of the sun, and that they happened at the ends of months, means that the knowledge of the orbit of which I have spoken above, as well as knowledge of the relative positions of moon and sun and the physical make-up of the moon must have percolated down among the masses. It must have been pretty generally accepted that a) the moon moved around in a cycle so that once a month it was in position to block the sun, b) it shined by reflected light and was solid (else how could it block the sun and not be seen itself), and c) the moon was closer to earth than the sun. Anaxagoras' discussion was the natural result of the Pythagorean treatment, offering the earth as the blocking body, but must be seen in the context of a generally understood and believed solar eclipse theory. The natural conclusion from all this is that by the last quarter of the century, the geometric model was a commonplace in Athens.

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[1] The discussion by Hippolytus, *Refut.* 1,8,6, makes this quite clear, as it has the sun, moon, and stars carried around by the aither. (Diels-Kranz^5 A 42).

[2] For Anaxagoras, see the previous note, and Anaxagoras, below.

[3] So too, Diels-Kranz^5 Aaxagoras B 18.

[4] I do not know how one might determine Plutarch's source for this very interesting comment. It suggests the kind of full documentation for the history of science which might have been available for the first century of our era.

Anaxagoras also knew of the inclination of the ecliptic[1], and much of what he said about celestial mechanics can be found in other writers of the end of the century. Archelaus[2] put the earth at the center, explained that the bodies were of different sizes, stated the inclination of the ecliptic, but argued that, because of different times of sunrise and set at different places, the earth could not have been flat. Empedocles, whose date in relation to Anaxagoras is much debated,[3] had an explanation of the eclipsing of the moon[4] which, as we have noted, was commonly accepted by the end of the century, and knew of the inclination of the ecliptic.[5] He too stated that the moon shines by light reflected from the sun,[6] but held a theory, not really well represented by the sources,[7] that the visible sun reflects the light of an archetype, each in a different hemisphere.

These developments in astronomical theory certainly made possible improved understandings of the motions of the bodies. At the same time as the celestial model was being developed, advances made in Greek mathematics were improving the facility with which men could operate with plane and spherical geometry; the numerical operations of the Pythagoreans, however, may have had more to do with calendar theory than had the new mathematics. I suggest that the Pythagorean concept that things "are" numbers may have led to a search for the correct number of the year and the month.

Pythagorean Numbers

While we are not told in detail of Pythagorean number theory, enough evidence exists to determine some of its characteristics, although, here, just as in any other discussion of any aspect of Pythagorean thought, we must admit to great doubt about any precision in attribution to time or to person. But "generally Pythagorean" serves our purpose, in searching for a general fifth century background to calendar theory. Aristotle's general description of Pythagoreanism (*Metaph.* A 5, 985b 23) expresses the theory as proposing that things are like numbers, and that numbers are the first (principles?) af all nature. Aristotle further explains that the Pythagoreans sought in the heavens the same properties and arrangements as they could find in numbers, and suggests that the theory of the counter-earth arose from a desire to make the number of bodies in the heavens agree with their perfect number 10. Elsewhere (*Metaph.* M 6, 1080b 16) Aristotle is quite explicit in attributing to the Pythagoreans the belief that the numbers are not abstract but real, and occupy space.[8] In *Metaph.* M 8, 1083b 11 Aristotle states that the Pythagoreans suppose bodies to be made up of numbers, and later more explicitly in *Metaph.* N 3, 1090a 20, he states that the Pythagoreans made reality numbers.[1]

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[1] Diels-Kranz[5] Anaxagoras A 67.

[2] *Ibid.* Archelaus A 4 (3).

[3] He was earlier according to Aristotle, *Metaph.* A 3, 984a 11. Cf. Kahn, *op.cit* pp. 163 ff., and W. K. C. Guthrie, *History of Greek Philosophy* 2, p. 128, note 4.

[4] *Ibid.* Empedocles A 59; B 42.

[5] *Ibid.* A 58.

[6] *Ibid.* A 30.

[7] *Ibid.*, and A 56.

[8] According to Aetius, I, 3, 19 (= Diels-Kranz[5] Ecphantus A 2) Ecphantus was the first to assert that the Pythagorean numbers were somatic.

It is not possible here to examine the application of this number theory, or to see its implications for Pythagorean thought. Rather, the importance is that this school of philosophers was operating with numbers as if they had magnitude and were the matter of which things are composed. It is but a short step to the concept of a proper number for each thing, a concept of importance to calendar thought, and in this regard some notions attributed to later Pythagoreans are of particular interest. Although the fragments of Philolaus are of such uncertain origin that they cannot be used with any confidence, the statements about Eurytus, who used pebbles in specific numbers to represent subjects, seem more reliable, Theophrastus, *Metaph.* 11, (Diels-Kranz^5 Eurytos A 2) reports that Eurytus gave a set number to man, horse, etc., and Aristotle comments on this in *Metaph.* N 5, 1092b 8, saying that Eurytus settled on a number for man, horse, etc. and imitated their shapes with pebbles. Alexander's comment on this, *Metaph.* 827, 9 (= Diels-Kranz^5 Eurytos A 3) explains in detail: settling on the number 250 for man, he would take 250 pebbles in various colors, and on a wall drawing of a man he would infix the pebbles, in the face, in the hands, and in the other appropriate places, until he had used up all the pebbles in his representation of a man, thus representing a man with the number of pebbles which he said defined man. Whether very simplistic, just placing the proper number of pebbles, or more sophisticated, using the pebbles to delineate the points which control the representation of man, this account of Eurytus' application of numbers shows the literalness with which the concept of "the *numbers* of things" was taken. I suggest, then, that the Pythagorean relationship between the number and its thing should be considered as part of the background to calendar theory, that is, the concern with delimiting the year (and the month) by its proper number of days.[2]

We may then come to a number of conclusions about the state of knowledge and theory current at the end of the fifth century. Certain phenomena had long been known: the solstices, equinoxes, perhaps the inclination of the ecliptic, and the use of the fundamental tool, the Gnomon, all were known as Greeks entered the fifth century. Some theory existed early, in the sixth century, and there had been proposed the idea that the moon reflected the light of the sun, that the earth was round, that it was not larger than the sun. The fifth century saw the creation of the geometrical model. In some theories, the planets, sun and moon traveled along separated orbits around a central earth, while in other theories, the earth was displaced from the center. The model, at least insofar as it affected the understanding of the earth and moon and sun, was understood and accepted in its simplest outlines by the common mass of people by the last quarter of the century, and the understanding of solar eclipses as caused by the interposition of the moon was a generally understood phenomenon by that time.

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[1] Similarly, and perhaps more related to astronomy, Aristotle attributes the idea to the Pythagoreans again in *De Caelo* 300a 16.

[2] I should like to note, in using the word delimit, that it is precisely the meaning of the word, *orizein*, used by Alexander to describe Eurytus' activities with the pebbles.

Not so eclipses of the moon, which, though understood by Anaxagoras, were still objects of fear most.

Generally speaking then, a geometric representation of the relationships between the bodies was a common mode of thought, and at the same time, at least one particular group considered phenomena to be numerical in nature. With the model available to make the true motions representable, it is not surprising that Greeks were able to devise reasonably accurate accounts of the periodization of the phenomena. It may very well be that Pythagorean number theory provided some impetus towards this calendar theorization. Since, we are told, the Pythagoreans developed their theory from the observation of some relationships between numbers and reality, it is certainly possible that one of the sets of relationships was the year or month, and the number of days of which they were made up. That is, from the Pythagorean position, one would want to know the true number of days of the year and the month, and such a number might well have been early proposed by Pythagoreans.

From the point of view of the astronomers, whether we judge a Pythagorean impulse to be likely or not, the question of the number of days in the year or month would have direct relevance to the explication of the model which had been developed. How many days does the moon use to go around the earth? That is a question to be asked early, once the idea of the motion is developed. It is a different question from "how long from first visibility to first visibility," and it will get a different answer. Similarly, the sun's motion along the ecliptic raises a similar question, "how many days does the sun take to return to the same solstice (or equinox)," or in other terms, what is the length of the tropical year?

These are the questions which the state of knowledge in the fifth century could generate, and the knowledge, theory, and tools available made it possible to answer them. What was necessary was care in the application of all three, but it is possible to predicate the growth of Greek astronomical and calendar theory on a basis for which we have evidence from Greek sources alone.[1]

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[1] I should like to note here that I have attempted to draw a Greek background because so little is known about any possible extra-Aegean origin of any of the Greek astronomical or mathematical knowledge. It is worth quoting O. Neugebauer, "History of Ancient Astronomy II," *Publications of the Astronomical Society of the Pacific* 58, 1946, p. 115, "We should now realize that we know next to nothing about earlier Greek mathematics and astronomy in general and about the contact with the Near East and its influence in particular. The method which involves the use of a few obscure citations from late authors for the restoration of the history of science during the course of centuries seems to me doomed to failure. This amounts to little more than an attempt to understand the history of modern science from a few corrupt quotations from Kant, Goethe, Shakespeare, and Dante." In a note on this comment, Neugebauer warns of dependence upon the fragments: "The fragments collected by Diels VS not only give an extremely incomplete picture of the lost writings but were certainly very much distorted by the authors from whose works they are taken. One needs only to look at the picture of oriental writings obtained from Greek tradition as compared with the originals." These warnings should be taken at full value, and I am not completely confident that, in trying only to give the general picture of concepts current in early times, I have still not pressed more weight on the fragments than they should properly be asked to bear.

2. *The Theory of Homocentric Spheres*

Eudoxus

The first cohesive and influential theory of celestial mechanics was that of Eudoxus. Diogenes Laertius (VIII 90) puts his acme in Ol.103 (368–65 B.C.) on the basis of Apollodorus.[1] His work must have been based at least in part upon observation, if we are to take seriously Strabo's comment[2] that his observations were from a height not much higher than houses. Eudoxus was able to explain the motions of the bodies in terms of nests of concentric spheres, with the whole system concentric around a spherical earth.[3] Each of the bodies was affixed to the equator of a sphere which revolved in a constant motion about its own poles. The sphere which carried the body was in turn carried by another sphere, with the axis of the inside sphere inclined to the axis of the outer sphere, which was in turn also revolving. Each body was in a nest of these, three spheres in total for each of the sun and moon, four spheres for each of the planets, and one for the fixed stars. The cumulative and interacting effects of the motions of all the spheres in each nest accounted for the motion of the body affixed to the inner sphere of each nest. The whole structure may be visualized as an onion, with the earth in the center, and 27 layers around it, but with the 27 layers in eight separate groups for moon, sun, five planets, and stars. The movements in each group were cumulative, but the 27 were not.

Aristotle's description of Eudoxus' account of the sun's spheres will illustrate the workings of one system.[4] The sun's motion was accounted for by the motion of three spheres, of which (the motion of) the first was the same as that of the fixed stars, the second moved along the zodiac (ecliptic), and the third was inclined to the plane of the zodiac (ecliptic).[5] The interaction of these three spheres produced the motion of the sun as a cumulative effect. The first, like that of the fixed stars with their diurnal motion around the earth, produced the motion of the sun around the earth which gives us day and night. The second sphere revolved once a year (one must presume a sidereal year) along the ecliptic, accounting for the sun's motion along the ecliptic against the background of the stars. The third sphere, with its axis inclined to the ecliptic, must have revolved at the same speed as the second,[1] to make the sun's motion along a great circle inclined to the ecliptic.

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[1] Quoted as *F.Gr.Hist.* 244 F 76. With the acme of age 40 in 368–5, Eudoxus would have been born in 408–5, and, dying at the age of 53 (*ibid.*), would have been dead by the middle of the century.

[2] II 14, C 119.

[3] Eudoxus, then, accepted the Pythagorean view that the earth was spherical.

[4] *Metaph.* L 8, 1073 b. The Eudoxan system was explained fully by Schiaparelli, *Le sfere omocentriche de Eudosso, di Calippo, e di Aristotele*, Pubblicazioni del R. Osservatorio di Brera in Milano IX, 1875. In addition to Aristotle's account, we have a fuller description of the system in Simplicius' commentary on Arist. *de Caelo* II,12, pp. 493–504, ed. Heiberg. A record of Eudoxus' researches is preserved in a papyrus written later than his time, probably early in the second century B.C., first published by Letronne in Brunet de Presle, *Notes et extraits des manuscripts* XVIII, 1865, (the Louvre papyrus, sometimes called Ars Eudoxi). The text was republished by F. Blass, *Eudoxi Ars Astronomica*, Kiel, 1887 (*Festschrift der Universität Kiel zum 22. März 1887)* which I have not been able to see, and was translated by P. Tannery, *Recherches sur l'astronomie ancienne*, Paris, 1893, pp. 284–294.

[5] Aristotle's description is much condensed, describing lunar and solar motion together, and followed by an equally condensed account of planetary motion.

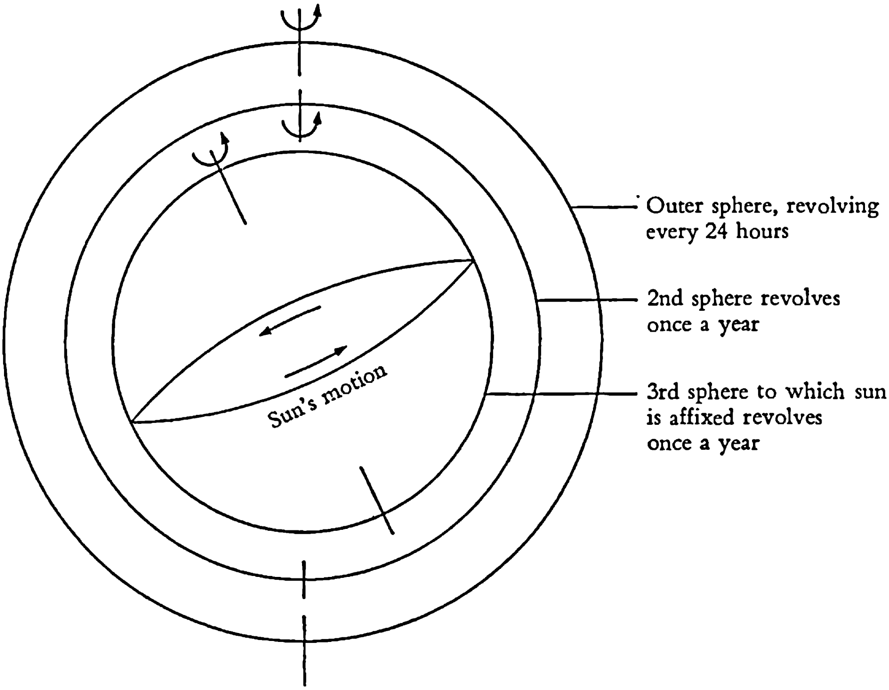
Outer sphere, revolving every 24 hours
2nd sphere revolves once a year
3rd sphere to which sun is affixed revolves once a year
Sun's motion

Fig. 11. The Theory of Homocentric spheres: the solar theory

The lunar theory also posited three spheres. The outer sphere, as in the case of the sun, revolved once every 24 hours, the second sphere, revolving along the ecliptic once every 223 lunations, moved in a direction the reverse of the first, and the inner sphere, to which the moon was fixed, inclined to the ecliptic at an angle to produce the moon's motion in latitude, revolved once a month.[2] The cumulative effect produced the daily motion (the first sphere), the moon's monthly circuit and its variation in latitude (the inner sphere), and the slow, retrograde motion of the nodes (the points at which the moon's path cuts the ecliptic, like the equinoxes for the sun) over a period of 18½ years (the middle sphere).

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[1] Simplicius' account (note above) says that the third sphere moved more slowly than the second, but this would not account for the phenomena, and must apply to the second sphere as compared with the first.

[2] Simplicius actually has the second sphere responsible for the monthly motion, and makes the third, inclined sphere, the slower one, as he does for the sun. But this must be a misunderstanding of Eudoxus, as, were the third sphere the slower one, the moon would pass north and south of the ecliptic only once every 18½ years, instead of once a year with the nodes sliding around the ecliptic over a period of 18½ years.

It is probably worth pointing out that the sun's motion could have been explained by only two spheres, one for the daily motion and the other, on the inclined sphere, incorporating both the annual motion along the ecliptic and the change in latitude (cf. Neugebauer, *Exact Sciences*, p. 153). But the regression of the lunar nodes required the third sphere, and consistency may have induced Eudoxus to posit three spheres for the sun as well; that he did so seems clear from Aristotle.

The motion of three spheres were enough to account for the motions of the sun and moon, and, with the addition of one other sphere, it was possible to explain the motions of the planets, including the apparent retrograde motions. The planetary theory[1] is not really relevant to our understanding of the effect of astronomical knowledge upon calendars. It is sufficient to see that, by the portrayal of the combinations of motions of the spheres, Eudoxus could both explain the apparent motions of the sun and moon, and in addition, predict positions, so that it was possible to determine with considerable precision just how long the periods of the bodies were. It was no longer necessary to depend solely upon the relatively unsophisticated Gnomon to determine the lengths of the periods, but mathematic calculation, based on the theory of the spheres, could bring greater precision.

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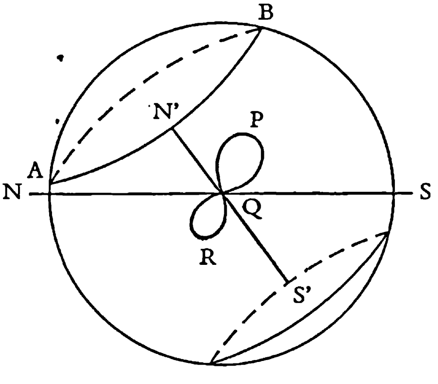
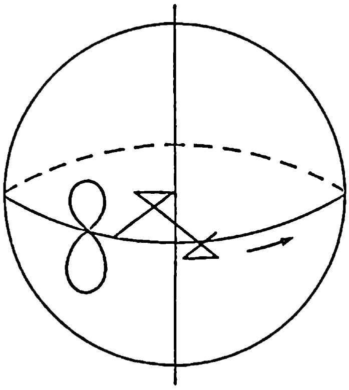
[1] The system is more complicated to explain than to propose. The first sphere accounts for the daily motions, and the second for the annual orbit, i.e., the motion for each planet which it made along the ecliptic in its period of revolution. The third had its axis perpendicular to the axis of the celestial sphere (its poles through the middle of the zodiac, Aristotle), that is it rotated at right angles to the ecliptic, and the fourth sphere rotated on an axis which was tilted with respect to the third sphere.

The cumulative motions of the third and fourth sphere, with the pole of the fourth sphere itself moving, and the planet itself, fixed to the equator of the fourth sphere affected by the movement of the third sphere, and the poles and rotation of the fourth sphere, was a figure 8, the Greek hippopede.

Sphere 3 revolves around poles N and S. Sphere 4 has poles fixed in 3 at N′ and S′., and revolves at the same speed. As sphere 4 revolves, it is also moved, carried by the motion of its poles along the small circle AB. For ¼ of the time, the 'upwards' components of the motion of 3-plus that of the motion of the poles of 4 and 4 itself dominate, carrying the body along a curve to P. Then the 'downwards' components take precedence, carrying the body back to Q, then on to R, and in the last ¼, back to Q. This hippopede is now imposed on sphere 2, so that changes in latitude are reflected, and, as the backwards motions along the hippopede are greater than the forwards motion of the sphere 2, the retrograde motions of the planets are reflected, as well as the varying speeds of the planets at different times of the year.





Callippus

Even greater fidelity to the phenomena were produced by improvements in the system which were introduced by Callippus, some years after Eudoxus introduced the theory. The spheres, as accepted by both Eudoxus and Callippus, revolved at constant velocities, and so, as proposed by Eudoxus, the sun's motion along the ecliptic was represented as uniform by the theory. Similarly, the moon's motion was presented as uniform in its progress through the heavens in completing a month. Yet, as we have seen (Chap. I, pp. 5–10), the eccentricity of the orbits of both earth and moon means that the velocities of sun and moon along the ecliptic are variable. In order to correct for this, Callippus added two more spheres each to the systems of sun and moon.[1] Simplicius, without giving an account of the motions of these two additional spheres,[2] does report that Eudemus recorded the explanation that they accounted for the differential in times between solstices and equinoxes, and anomaly in motions.[3]

The theory of homocentric spheres, which was accepted in the main by Aristotle in his *de Caelo*,[4] provided a model of sufficient sophistication, and one which presented the possibility of computation for prediction, so that for practical purposes the problems of the heavens were solved. Although the theory was followed by one of excentric motion,[5] and yielded to a model of epicycles[6] which reached great complexity to explain the observed phenomena, particularly of the planets, far better than could the concept of the homocentric spheres, the problems of solar and lunar motion could all be worked out within the context of the homocentric spheres. The periods were known with great precision, and certainly, for calendar purposes at least, the successor theories did not alter the periods which had to be taken into consideration. By the end of the fourth century B.C. astronomy had advanced to the point at which it was possible to create a calendar theory to provide periodisation which stood until the gregorian reform of the sixteenth century of our era.

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[1] Aristotle, *Metaph.* L 8, 1073 b 35.

[2] *Commentarii in Arist. de Caelo* II,12 (ed. Heiberg) p. 497.

[3] Additional spheres were needed for some of the planets. Jupiter and Saturn were satisfactorily explained by Eudoxus, but Mars definitely was not, so Callippus added one sphere each to the groups of Mars, Venus, and Mercury.

[4] The discussion appears in Book II. In order to have the cosmos be filled by the spheres, so that the groups would connect and yet not influence the motion of each other, Aristotle interposed additional spheres, "unrolling" spheres, between the groups. To the planetary groups of Callippus, he added three "unrolling" spheres to the groups of Jupiter and Saturn, and four to each of Mars, Venus and Mercury. To the sun he added four also, but to the moon, which was the inner body, he added none, as, with no spheres inside its group, there was no need to "unroll" the effects of that group.

The explanation was fitted to Aristotle's general metaphysical notions, and it is worth noting that Aristotle insisted on the central, unmoving position of the earth. He also demonstrated the sphericity of the earth, calling upon observation, e.g., of lunar eclipses and of change in the heavens as earth position changes, to demonstrate it.

I cannot here deal with the complex problem of relating Plato's cosmology in the *Timaeus* to the discussion. Although it seems to fit into the development of astronomical knowledge, e.g., accepting the sphericity of the earth, it is unlikely that any of the concepts set forth could have affcted practical astronomical work, particularly since the critical questions of speeds of the bodies are not treated. For a careful study of the *Timaeus* one may refer to F.M. Cornford's *Plato's Cosmology*, London, 1937.

[5] Simplicius (*op.cit.* p. 507) reports that the theory of excentricity and epicycles was invented because the homocentric spheres did not "save the phenomena," noting that some say that the theory of excentrics was invented by the Pythagoreans. According to Ptolemy, (*Almagest* Heiberg II, p. 450), Apollonius of Pergae showed how it is possible to save the phenomena either by assuming epicyclic motion or with the assumption of excentric motion, and this comment, along with that by Simplicius, seems to suggest the theory of excentric motion as contemporary with the shift to the theory of epicycles, or perhaps even as

3. Astronomical Calendar Cycles

Early Cycles

Despite the not inconsiderable modern discussion of Greek calendaric cycles in the early period, the evidence about early cycles is extremely scanty, and, for any cycles before the octaeteris discussed by Geminus, we have only[1] the testimony of Censorinus:[2]

Veteres in Graecia civitates cum animadverterent, dum sol annuo cursu orbem suum circumit, lunam novam interdum tredecies[3] exoriri, idque saepe alternis fieri, arbi-

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an alternative to the homocentric spheres which itself yielded to the epicycles.

It is perhaps worth noting that in all this, the concept that the earth was the center for the revolution of the bodies did not go unchallenged, as seems quite clear from Plutarch (*Mor.* 922 F; *De. Fac. Lun.* 6), stating that Aristarchus of Samos proposed to save the phenomena by stating that the earth moved along the ecliptic and revolved around its axis.

[6] As noted above, Apollonius offered the choice between theories of excentrics and of epicycles. The latter was chosen, we are told by Theon of Smyrna (ed. Martin, p. 300) by Hipparchus, the astronomer who discovered the precession of the equinoxes, although Ptolemy (*Almagest*, ed. Heiberg, I, p. 210) tells us that Hipparchus proposed only solar and lunar theories, only collected evidence about the planets, and showed that observation did not accord with any of the earlier theories.

Ptolemy himself, of course, was the culmination for the Greek world, at least, of the epicyclic theory, a theory in which the total motion was compounded of the aggregate of motions of a number of cycles, each depending on the next, so that the complexity of planetary motion, as observed, could be explained. An excellent summary of the Ptolemaic system may be found in Appendix I of Neugebauer's *Exact Sciences*, which also see for bibliography, and particularly p. 206 for reference to general works on Greek Astronomy.

I should like to warn that this note and the two preceding are in no way intended to be comprehensive, either for reference to ancient theories or citation of ancient sources bearing on any matter discussed.

[1] The remark of Herodotus I,32, discussing the length of human life, that in 70 years without the intercalary month there are 25200 days (360 days per year = 12×30), and with the 35 intercalary months adding 1050 days (= 35×30) the total is 26250 days, may well not be based on any real calendar, and certainly cannot be based on an astronomical calendar; the fifth century could do better than that. Herodotus is probably just doing a rough calculation.

[2] *De Die Natali* 18,2–5, ed. Jahn.

[3] Codd. D R have tridec., and Jahn reads terdecies, but surely tridecies is intended.

trati sunt lunares duodecim menses et dimidiatum ad annum naturalem convenire. Itaque annos civiles sic statuerunt, ut intercalando facerent alternos duodecim mensum, alternos tredecim, utrumque annum separatum vertentem, iunctos ambo annum magnum vocantes. Idque tempus trieterida adpellabant, quod tertio quoque anno intercalabatur, quamvis biennii circuitus et revera dieteris esset; unde mysteria, quae Libero patri alternis fiunt annis, trieterica a poetis dicuntur. Postea cognito errore hoc tempus duplicarunt et tetraeterida fecerunt: sed et eam, quod quinto quoque anno redibat, pentaeterida nominabant. Qui annus magnus ex quadrennio commodior visus est * * solis annum constare ex diebus CCCLXV et diei parte circiter quarta, quae unum in quadrennium diem conficeret. Quare agon et in Elide Iovi Olympio et Romae Capitolino quinto quoque anno redeunte celebratur. Hoc quoque tempus, quod ad solis modo cursum nec ad lunae congruere videbatur, duplicatum est et octaeteris facta, quae tunc ennaeteris vocitata, quia primus eius annus nono quoque anno redibat. Hunc circuitum verum annum magnum esse pleraque Graecia existimavit, quod ex annis vertentibus solidis constaret, ut proprie in anno magno fieri par est. Nam dies sunt solidi * * uno minus centum, annique vertentes solidi octo. Hanc octaeterida vulgo creditum est ab Eudoxo Gnidio institutam, sed alii Cleostratum Tenedium primum ferunt composuisse et postea alios aliter, qui mensibus varie intercalendis suas octaeteridas protulerunt, ut fecit Harpalus, Nauteles, Menestratus, item alii, in quis Dositheus, cuius maxime octaeteris Eudoxi inscribitur.

It is not so easy to understand what is meant here, and it is probably the case that Censorinus is combining in one discussion a description of civil practice (in Graecia civitates) with a description of early attempts to render a solar year which was astronomically correct. Indeed, it is quite possible that everything said here is merely deduction, Censorinus describing what would be logical predecessors of the astronomical calendars which he knew. It is conceivable that the alternate year intercalation is based upon a description like that of Herodotus, as indeed may be Geminus' statement (below) that the early calendars had 30 day months. Neither of these practices are attested in Greece, although both are implied by Herodotus I, 32.

The first hint of astronomical intervention in calendars comes with the mention of *cognito errore.* This can only refer to the incompatibility of biennial intercalation with the tropical year, and, since with the error understood, Censorinus tells us that the four year cycle was introduced, we have here to deal with the ¼ day excess over the 365 day year, which Censorinus specifically describes. But the objective reality of such a cycle is at least questionable. For civil calendars it must be excluded, since there is not the merest hint of any such cyclical control of any civil calendar in Greece, and so if such a cycle did exist, it must have been used by the astronomers. It would certainly be possible to create this four-year-cycle in the state of knowledge of the late sixth century. Yet this cycle may be Censorinus' invention, to yield a smooth progression from non-astronomical to astronomical calendars; Geminus, as we shall see, says nothing of it. Furthermore, Censorinus' introduction of the quadrennial game cycle, as celebrated with that periodicity because of the four-year-calendar-cycle would lead me to suspect the whole story. Nevertheless, it cannot be disproved, and we may judge that there is a possibility that the early astronomers of the sixth century first worked out a solar year in a calendar which closely approximated the true tropical year, and if this be the case, that four year cycle was purely solar, as Censorinus said, and made no attempt to accommodate itself to the moon. How it treated of the months, if it made any attempt to do so at all, we cannot say,[1] and indeed, all we know of it is that it accounted for the 365¼ day tropical year.

The Octaeteris

Of the octaeteris we have a much clearer picture. Geminus discusses it at great length in Chapter VIII of the *Eisagoge*:

οἱ δὲ Ἕλληνες τὴν ἐναντίαν γνώμην ἔχοντες τοὺς μὲν ἐνιαυτοὺς καθ' ἥλιον ἄγουσι, τοὺς δὲ μῆνας καὶ τὰς ἡμέρας κατὰ σελήνην. οἱ μὲν οὖν ἀρχαῖοι τοὺς μῆνας τριακονθημέρους ἦγον, τοὺς δὲ ἐμβολίμους παρ' ἐνιαυτόν. ταχέως δ' ἐπὶ τοῦ φαινομένου ἐλεγχομένης τῆς ἀληθείας διὰ τὸ τὰς ἡμέρας καὶ τοὺς μῆνας μὴ συμφωνεῖν τῇ σελήνῃ, τοὺς δὲ ἐνιαυτοὺς μὴ στοιχεῖν τῷ ἡλίῳ [ὅθεν] ἐζήτουν περίοδον, ἥτις κατὰ μὲν τοὺς ἐνιαυτοὺς τῷ ἡλίῳ συμφωνήσει, κατὰ δὲ τοὺς μῆνας καὶ τὰς ἡμέρας τῇ σελήνῃ, περιέχει δὲ [ὁ τῆς περιόδου χρόνος] ὅλους μῆνας καὶ ὅλας ἡμέρας καὶ ὅλους ἐνιαυτούς. πρώτην δὲ συνεστήσαντο τὴν περίοδον τῆς ὀκταετηρίδος, ἥτις περιέχει μὲν μῆνας ϛ θ', ἐν οἷς ἐμβολίμους τρεῖς, ἡμέρας δὲ ͵β ϡ κβ', ἔτη δὲ ὀκτώ. συνεστήσαντο δὲ τὴν ὀκταετηρίδα τὸν τρόπον τοῦτον. ἐπεὶ γὰρ ὁ καθ' ἥλιον ἐνιαυτὸς ἡμερῶν ἐστι τξε' δ^{ον}, ὁ δὲ κατὰ σελήνην ἐνιαυτός ἐστιν ἡμερῶν τνδ', ἔλαβον τὴν ὑπεροχήν, ἣν ὑπερέχει ὁ καθ' ἥλιον ἐνιαυτὸς τοῦ κατὰ σελήνην. εἰσὶ δὲ ἡμέραι ια' δ^{ον}. ἐὰν ἄρα κατὰ σελήνην ἄγωμεν τοὺς μῆνας ἐν τῷ ἐνιαυτῷ, ὑστερήσομεν ἡμέρας παρὰ τὸν τοῦ ἡλίου ἐνιαυτὸν ια' δ^{ον}. ἐζήτησαν οὖν, ποσάκις αὗται αἱ ἡμέραι πολυπλασιασθεῖσαι ἀποτελοῦσιν ὅλας ἡμέρας καὶ ὅλους μῆνας. ὀκτάκις δὲ

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[1] Censorinus' treatment seems contradictory, as the four-year-cycle is made by doubling the two year cycle, which has month intercalations, while Censorinus specifically says that it did not fit the moon. Another reason to suspect it.

Ginzel (II, 372) also suspected the development as given by Censorinus, arguing both that the early date of the tetraeteris renders it suspicious, and judging that it may have arisen from a misunderstanding of the quadrennial games. As we shall see above (p. 40), the dating argument is not the best, as such a tetraeteris might be dated to the middle of the sixth century, or even later, when it would be possible as a mathematical construct, if not actually used. The comment about the games is more reasonable. Ideler had earlier doubted the reality of the tetraeteris (II, 606–7), while Schmidt (*Handb. Gr. Chron.* 1888, pp. 38–46) tried to deal with the tetraeteris as a reality, making alternate tetraeterides of 50 and 49 months, so that the lunar structure would be preserved, while accommodating the year to the tropical year.

If any reality lies behind the statement of Censorinus, I should judge it to be the reality of mathematical computation, i.e., the *astronomers* knew that the solar year could be rendered into whole days over a four year period, but that this could not be conveniently worked out with months, and therefore, the octaeteris was devised to accomplish both necessary objectives. Censorinus may have been confusing information about the mathematical procedures with the games. Or he may just have been wrong.

πολυπλασιασθεῖσαι ἀποτελοῦσιν [ὅλας ἡμέρας καὶ ὅλους μῆνας, ἤγουν] ἡμέρας μὲν ς′, μῆνας δὲ τρεῖς. ἐπεὶ οὖν ἐν τῷ ἐνιαυτῷ παρὰ τὸν ἥλιον ὑστεροῦμεν ἡμέρας ια′ δ^{ν}, φανερὸν ὅτι ἐν τοῖς ὀκτὼ ἔτεσιν ὑστερήσομεν παρὰ τὸν ἥλιον ἡμέρας ς′, ὅπερ εἰσὶ μῆνες τρεῖς. δι' ἣν αἰτίαν καθ' ἑκάστην ὀκταετηρίδα τρεῖς ἄγονται μῆνες ἐμβόλιμοι, ἵνα τὸ καθ' ἕκαστον ἐνιαυτὸν γινόμενον ἔλλειμμα πρὸς τὸν ἥλιον ἀναπληρωθῇ καὶ πάλιν ἐξ ἀρχῆς διελθόντων τῶν ὀκτὼ ἐτῶν συμφωνῶσιν <αἱ ἑορταὶ> πρὸς τὰς κατ' ἔτος ὥρας. γινομένου γὰρ τούτου αἱ θυσίαι τοῖς θεοῖς διὰ παντὸς ἐπιτελεσθήσονται κατὰ τὰς αὐτὰς ὥρας τοῦ ἐνιαυτοῦ.

Ἤδη μέντοι γε τοὺς ἐμβολίμους διέταξαν, ὡς ἦν ἐνδεχόμενον μάλιστα δι' ἴσου. οὔτε γὰρ περιμένειν δεῖ, ἕως οὗ μηνιαῖον γένηται παράλλαγμα πρὸς τὸ φαινόμενον, οὔτε προλαμβάνειν παρὰ τὸν ἡλιακὸν δρόμον μῆνα ὅλον. δι' ἣν αἰτίαν τοὺς ἐμβολίμους μῆνας ἔταξαν ἄγεσθαι ἐν τῷ τρίτῳ ἔτει καὶ πέμπτῳ καὶ ὀγδόῳ, δύο μὲν μῆνας μεταξὺ δύο ἐτῶν πιπτόντων, ἕνα δὲ μεταξὺ ἐνιαυτοῦ ἑνὸς ἀγομένου. οὐδὲν δὲ διαφέρει, ἐὰν καὶ ἐν ἄλλοις ἔτεσι τὴν αὐτὴν διάταξιν τῶν ἐμβολίμων μηνῶν ποιήσηταί τις.

[Ἄγεται δὲ ὁ κατὰ σελήνην ἐνιαυτὸς ἡμερῶν τνδ′. δι' αἰτίαν δὲ τοιάνδε ὑπέλαβον εἶναι τὸν κατὰ σελήνην μῆνα ἡμερῶν κθ′ 𐅵″, τὴν δὲ δίμηνον ἡμερῶν νθ′. ὅθεν κοῖλον καὶ πλήρη μῆνα παρὰ μῆνα ἄγουσιν, ὅτι ἡ δίμηνος ἡ κατὰ σελήνην ἡμερῶν ἐστι νθ′. γίνονται οὖν ἐν τῷ ἐνιαυτῷ ἓξ πλήρεις καὶ ἓξ κοῖλοι· συνάγονται δὲ ἡμέραι τνδ′. διὰ δὴ ταύτην τὴν αἰτίαν μῆνα παρὰ μῆνα πλήρη καὶ κοῖλον ἄγουσιν.]

Εἰ μὲν οὖν ἔδει τοῖς καθ' ἥλιον ἐνιαυτοῖς μόνον ἡμᾶς συμφωνεῖν, ἀπήρκει ἂν τῇ προειρημένῃ περιόδῳ χρωμένους συμφωνεῖν πρὸς τὰ φαινόμενα. ἐπεὶ δὲ οὐ μόνον δεῖ τοὺς ἐνιαυτοὺς ἄγειν καθ' ἥλιον, ἀλλὰ καὶ τοὺς μῆνας καὶ τὰς ἡμέρας κατὰ σελήνην, ἐσκέψαντο, πῶς ἂν καὶ τοῦτο τοῦ τέλους τυγχάνοι. ἐπεὶ τοίνυν ὁ κατὰ σελήνην μὴν ἀκριβῶς ἐστιν εἰλημμένος ἡμερῶν κθ′ 𐅵″ λγ^{ου}, εἰσὶ δὲ ἐν τῇ ὀκταετηρίδι σὺν τοῖς ἐμβολίμοις μῆνες ς θ′, ἐπολυπλασίασαν τὰς τοῦ μηνὸς ἡμέρας κθ′ 𐅵″ λγ^{ν} ἐπὶ τοὺς ςθ′ μῆνας· γίνονται οὖν ἡμέραι ͵βϡ κγ′ 𐅵″. ἐν ἄρα τοῖς ὀκτὼ ἔτεσι τοῖς καθ' ἥλιον δεῖ ἄγεσθαι ἡμέρας κατὰ σελήνην ͵βϡ κγ′ 𐅵″. ἀλλ' [ἐπεὶ] ὁ καθ' ἥλιον ἐνιαυτός ἐστιν ἡμερῶν τξε′ δ^{ου}, τὰ δὲ ὀκτὼ ἔτη καθ' ἥλιον περιέχει ἡμέρας ͵βϡ κβ′. ὀκταπλασιασθεῖσαι γὰρ αἱ τοῦ ἐνιαυτοῦ ἡμέραι τοσοῦτον ἀποτελοῦσι πλῆθος. ἐπεὶ οὖν αἱ κατὰ σελήνην ἡμέραι ἦσαν ἐν τοῖς ὀκτὼ ἔτεσι ͵βϡ κγ′ 𐅵″, ὑστερήσομεν καθ' ἑκάστην ὀκταετηρίδα παρὰ τὴν σελήνην ἡμέρᾳ μιᾷ καὶ ἡμίσει. ἐν ἄρα τοῖς ις′ ἔτεσιν ὑστερήσομεν παρὰ τὴν σελήνην ἡμέρας τρεῖς. δι' ἣν αἰτίαν καθ' ἑκάστην ἑκκαιδεκαετηρίδα πρὸς τὸν τῆς σελήνης δρόμον τρεῖς ἐπάγονται ἡμέραι, ἵνα κατὰ μὲν ἥλιον τοὺς ἐνιαυτοὺς ἄγωμεν, κατὰ δὲ σελήνην τοὺς μῆνας καὶ τὰς ἡμέρας.

Γινομένης δὲ τῆς τοιαύτης διορθώσεως ἕτερον ἁμάρτημα ἐπακολουθεῖ. αἱ γὰρ κατὰ σελήνην ἡμέραι ἐπαγόμεναι τρεῖς ἐν τοῖς ις′ ἔτεσι πλεονάζουσι πρὸς τὸν ἥλιον ἐν ταῖς δέκα ἑκκαιδεκαετηρίσι λ′ ἡμέρας [πρὸς τὰς τοῦ ἡλίου ὥρας], ὅπερ ἐστὶ μήν. δι' ἣν αἰτίαν δι' ἐτῶν ρξ′ εἷς μὴν τῶν ἐμβολίμων ἐκ <μιᾶς> τῶν ὀκταετηρίδων ὑφαιρεῖται. ἀντὶ γὰρ τῶν τριῶν μηνῶν τῶν ὀφειλόντων ἐν τοῖς ὀκτὼ ἔτεσιν ἄγεσθαι, δύο μόνον ἐμβάλλονται. ὥστε πάλιν ἐξ ἀρχῆς τοῦ μηνὸς ὑπεξαιρεθέντος κατὰ μὲν τοὺς μῆνας καὶ τὰς ἡμέρας τῇ σελήνῃ συμφωνεῖν, κατὰ δὲ τοὺς ἐνιαυτοὺς τῷ ἡλίῳ.

Τοιαύτης δὲ γινομένης τῆς διορθώσεως οὐδ᾽ οὕτως συμβαίνει συμφωνεῖν πρὸς τυ φαινόμενον. ὅλην γὰρ τὴν ὀκταετηρίδα διημαρτῆσθαι συμβέβηκε καὶ κατὰ τοὺς μῆνας καὶ κατὰ τὰς ἡμέρας καὶ κατὰ τοὺς ἐμβολίμους. [ὁ γὰρ μηνιαῖος χρόνος οὐκ ἀκριβῶς εἴληπται. ἔστι γὰρ ὁ μηνιαῖος χρόνος ἀκριβῶς λαμβανόμενος ἡμερῶν κθ′ καὶ πρώτων ἑξηκοστῶν λα′ καὶ δευτέρων ν″ καὶ τρίτων η‴ καὶ τετάρτων κ⁗. διὰ δὲ τοῦτο δεήσει ποτὲ ἐν τοῖς ις′ ἔτεσιν ἀντὶ τριῶν ἐμβολίμων ἡμερῶν δ′ ἐπάγεσθαι. ὅθεν οὐ δεῖ ἐν οὐδεμιᾷ περιόδῳ ἴσους τοὺς κοίλους τοῖς πλήρεσιν ἄγειν, ἀλλὰ πλεονάζειν τοὺς πλήρεις τῶν κοίλων. εἰ μὲν γὰρ ὁ μηνιαῖος χρόνος μόνον ἦν ἡμερῶν κθ′ ↄ″, ἴσους ἔδει τοὺς πλήρεις καὶ τοὺς κοίλους μῆνας ἄγεσθαι. νυνὶ δέ ἐστι μόριον αἰσθητὸν ἐν τῷ μηνιαίῳ χρόνῳ, ὃ συμπληροῖ ἡμερήσιον μέγεθος. δι᾽ ἣν αἰτίαν δεήσει πλεονάζειν τοὺς πλήρεις τῶν κοίλων μηνῶν.] οὐδὲ μὴν ἐν τοῖς ὀκτὼ ἔτεσι τρεῖς [οὖν] ἔνεισι μῆνες ἐμβόλιμοι. εἰ μὲν γὰρ ἦν ὁ ἐνιαυτὸς ὁ κατὰ σελήνην ἡμερῶν τνδ′, ἣν ἂν ἡ ὑπεροχὴ τοῦ ἡλιακοῦ ἐνιαυτοῦ ἡμερῶν ια′ δ^{ου}. αὗται δὲ ὀκτάκις πολυπλασιασθεῖσαι συνεπλήρουν ἂν τοὺς τρεῖς μῆνας τοὺς ἐμβολίμους. νυνὶ δὲ ὁ κατὰ σελήνην ἐνιαυτὸς ἀκριβῶς ἐστι <ν εἰλημμένος ἡμερῶν> τνδ′ ὡς ἔγγιστα γ^{ου}. ἐὰν οὖν ἀφέλωμεν τὰ τνδ′ γ^{ον} ἀπὸ τῶν τξε′ δ^{ου}, καταλειφθήσονται ἡμέραι ι′ ↄ″ γ^{ον} ιβ^{ον}. αὗται δὲ ὀκταπλασιασθεῖσαι ἀποτελοῦσιν ἡμέρας πζ′ ὡς ἔγγιστα γ^{ον}. αὗται δὲ αἱ ἡμέραι οὐ συμπληροῦσι τρεῖς μῆνας. δι᾽ ἣν αἰτίαν οὐ δεῖ ἄγειν ἐν τοῖς ὀκτὼ ἔτεσι τρεῖς μῆνας ἐμβολίμους. τοῦτο δὲ καὶ διὰ τῆς ἐννεακαιδεκαετηρίδος φανερὸν γίνεται. ἐν γὰρ τοῖς ιθ′ ἔτεσιν ἑπτὰ μῆνες ἐμβόλιμοι ἄγονται καὶ ἐκ πλειόνων χρόνων συμφωνήσει ἡ ἐννεακαιδεκαετηρὶς κατὰ τὴν τῶν μηνῶν ἀγωγήν. ἐν ἄρα τοῖς ὀκτὼ ἐννεακαιδεκαετηρίσιν ἐμβόλιμοι μῆνες ἀχθήσονται νϛ′. ἐν δὲ τῇ ὀκταετηρίδι μῆνες ἐμβόλιμοι ἄγονται τρεῖς. ἐν ἄρα ταῖς ιθ′ ὀκταετηρίσιν, ὅπερ ἐστὶν ἔτη ρνβ′, ἐμβόλιμοι ἄγονται νζ′. ἐν δὲ τῷ αὐτῷ χρόνῳ|κατὰ τὴν ἐννεακαιδεκαετηρίδα τὴν συμφωνοῦσαν τοῖς φαινομένοις ἐμβόλιμοι μῆνες ἄγονται νϛ′. ὥστε πλεονάζειν τὴν ὀκταετηρίδα ἑνὶ μηνὶ ἐμβολίμῳ. οὐκ ἄρα ἡ ὀκταετηρὶς τρεῖς μῆνας ἔχει ἐμβολίμους, ἀλλὰ καὶ κατὰ τοῦτο διημάρτηται ἡ περίοδος.

What Geminus is saying here is reasonably straightforward.[1] He is discussing the operation of the octaeteris itself, the accommodation between calendar periods and astronomical phenomena, and errors in accommodation. He begins with a mention of 30 day months and intercalation by years, possibly based on Herodotus, and proceeds directly to a description of the octaeteris. Taking the true tropical year of 365¼ days against the lunar (12 month) year of 354 days, the tropical year exceeds the lunar by 11¼ days. The multiplication of 11¼ by eight yields a whole number of days, 90, which is also a whole number of months, 3. Thus in an 8 year period, three 30 day months must be intercalated into the lunar year to bring the whole period into accord with the tropical year, and the intercalation was accomplished over the whole period, in the third, fifth, and eighth year, to keep the running discrepancy at a minimum. The system may be represented schematically as follows:

OOIOIOOIOOIOIOOI.

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[1] Gemini *Elementorum Astronomiae*, ed. E. J. Dijksterhuis, Textus Minores XXII, Leiden, 1957.

The difficulty in interpreting the system fully lies in the bracketed passage. If that passage was in the original text, Geminus is saying that within the individual years, the month lengths were ordered arbitrarily, 29/30, to approximate the true length of the synodic month of ca. 29½ days. Yet, in the succeeding section, Geminus explains at length how an elaborate correction was made in order to keep the calendar precisely with the moon and the sun both: the lunar month is not precisely 29½ days, but actually 29 and 35/66ths, so that in 8 years the lunar accumulation is 2923½ while the solar accumulation is only 2922; therefore, over a 16 year period 3 days were added (i.e. to the solar year) and with this accumulated to 30 days in 160 years, in that period one intercalary month was omitted. With this in mind, the only reconciliation between the bracketed passage, which describes a system which would have the calendar out of accord with the moon by a day from time to time, and the subsequent section which entails close correlation, would be to assume that a day error was acceptable, but an accumulation beyond that was seen as undesirable.

Thus, if we take the system as represented by Geminus, we have a base of an octaeteris, doubled, with 3 days added, OOIOIOOIOOIOIOOI + 3 days × 10 such cycles – 1 intercalary month. How these three extra days were accommodated into the solar year we do not know, nor do we have any notion of the determination of the intercalary month which was to be omitted from the 160 year cycle, apart from presuming that it must have been done in about the middle of the period to keep the discrepancy from the tropical year to a minimum. A number of possibilities must be kept in mind. First, it may well be that the 160 cycle never was actually put in practice, but rather, was a theoretical correction of the octaeteris put forward by the astronomers. Or possibly, the alternation of 29/30 days does not belong in the text, so that the organization of lunar months was to have been by observation. If this were the case, the advance of 3 days per 16 years would have occurred without plan, and the astronomers, observing this fact, would have proposed the omission of one intercalary month in 160 years as a correction to preserve the solar year's correlation with the tropical year. In any case, it would seem quite clear that what we have to do with here is an astronomical attempt to create a calendar, i.e., an astronomer's calendar, since Geminus goes to great lengths to discuss the errors with regard to the phenomena and ends his discussion of the octaeteris with a detailed presentation of the minute errors in the 160 year system which led to the devising of the 19 year cycle.[1] We have then an account of the development of astronomical calendars down to the 19 year cycle.[2]

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[1] The true lunar month, according to Geminus, is 29 days 31′ 50″ 8‴ 20⁗ / 60ths (exactly the figure of Hipparchus, Ptol. *Alm.* I, ed. Heib. p. 271), or 29.5305941 days, slightly longer than the 29½+1/33 (29.530303 days).

[2] I should like to emphasize here that I am treating this evidence only as pertaining to astronomical calendars, and in this I differ from my predecessors in this field. I make, therefore, no attempt to show how this astronomical calendar worked out in individual city civil reckoning, as I do not believe that it was used for such. For manipulations of the octaeteris with Greek city calendars, see, e.g., A. Boeckh, *Geschichte der Mondcyclen der Hellenen*, Leipzig, 1855 (2ter Beitr. 1857, as *Epigraphisch-chronologische Studien* etc.); A. Schmidt, *Handbuch der*

The date of the introduction of the octaeteris is difficult to determine. The *terminus ante quem* must be some time before 432, the year of the introduction of the Metonic cycle (q.v.). It seems to me futile to attempt to use vague indicators of calendar reform, as that by Solon,[1] to place in time the various stages of the development of the octaeteris or its predecessors among the astronomical calendars. If there is any procedure which has validity, it is the examination of the evidence of the *astronomers* who are credited with developments by ancient commentators on the calendar. Censorinus quite properly rejects the report that Eudoxus had invented the octaeteris, and reports that Cleostratus is credited with its construction. The attribution is reasonable, although the date is difficult to determine with any accuracy. Cleostratus' astronomical activities are reasonably well attested (Cf. Diels, 1937, 5) so that it is perfectly consistent with what we know of his activity to believe that he did devise an astronomical calendar. Theophrastus, *de sign.* 4 (Diels-Kranz5 Kleostratos A 1) reports him among a group of astronomers, one of whom was the teacher of Meton. If this attribution means that Cleostratus was in the generation before Meton, we should want to date him to the second quarter of the fifth century at the earliest. On the other hand, Theophrastus may not have had any intention of making Cleostratus of that generation; he may have thought of him as earlier, or indeed, later, although this seems less likely. Pliny, *Nat. Hist.* II, 31 (Diels-Kranz5 Anaximander A 5, Kleostratos B 2) reports that Anaximander is said to have discovered the obliquity of the ecliptic in Ol.58 (548–45) and that afterwards Cleostratus divided it, i.e., the zodiac, into signs: *signa deinde in eo Cleostratus, et prima arietis ac sagittari, sphaeram ipsam ante multo Atlas.* While it is difficult to get a precise interval of time out of *deinde*, it would seem that Pliny thought of Cleostratus as a successor to Anaximander, and that the Pliny passage would justify us in placing Cleostratus at the end of the sixth century. Finally, Censorinus, concluding the discussion of Cleostratus, names as one of the devisers of octaeterides *postea* one Harpalus, a man whom Festus Avienus (*Arat.*, p. 1366; cf. Diels-Kranz5 Vol. I, p. 42, note 12) makes out as older than Meton. This would tend towards confirmation of the early date of Cleostratus, and if Diels is correct that the astronomer Harpalus is the same man as the constructor of the

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griechischen Chronologie, Jena, 1888, Ginzel II, pp. 366ff., and the literature therein cited.

[1] Diog. Laert. I,59 reports that Solon ἠξίωσέ τε Ἀθηναίους τὰς ἡμέρας κατὰ σελήνην ἄγειν, and Plut. *Solon*, 25 says that observing that the moon often catches up with and passes the moon on the same day, named that day ἔνην καὶ νέαν, giving the first part to the waning month, and the latter part to the month beginning, and following that day with the first of the month; Plutarch here further credits Solon with the backwards count of the last ten days of the month. Whether or not these 'inventions' are rightly credited to Solon, we have no indication that any sort of cycle was introduced. Dinsmoor speculates (*Archons*, 1931, p. 301) cautiously that the double year mentioned in Hdt. I 32 might have been the Solonian reform, since he believed that some calendar reform had been effected. But Dinsmoor rejected the claim of Boeckh (*Mondcyclen*, 1855, p. 11–17) that Solon had introduced the octaeteris, and also the view of Ginzel (II, pp. 378–385) in a chapter on "Die Octaeteris der solonischen Zeit" that Solon had introduced the advanced octaeteris of 2923½ days, doubled and multiplied by ten to make the 160 year cycle. There is not the slightest support from antiquity to credit Solon with any of this.

bridges for Xerxes in 481,[1] we have strong evidence for a date at the end of the sixth century for his predecessor Cleostratus. If we date Cleostratus to that time,[2] and conclude that the octaeteris was devised towards the end of the sixth century, our conclusion would certainly be in accord with the state of astronomical knowledge in the Greek world at that time. By the end of the sixth century, with the advances brought about by the use of the Gnomon and the determination of the solstices, the proper length of the tropical year could be, and almost surely was, known to the astronomers with at least enough precision to establish the concept of the 365¼ day year, the period upon which the basic octaeteris of Geminus, as well, probably, as that of Censorinus[3] depends.

If we place the introduction of the octaeteris at the end of the sixth century, late, that is, in comparison to the attributions by my predecessors, we may solve some problems which confront moderns. For example, Censorinus' tetraeteris, if not wholly erroneous, can be understood in terms of astronomical knowledge at the end of the sixth century. Ginzel (II, 375–77), in order to explain the accurate octaeteris described by Geminus, which he thought preceded Solon, who in turn was responsible for the improved octaeteris, suggested that a long period of observation through the ninth and eight centuries finally came in the seventh century to fruition with Geminus' octaeteris. If I am right that the octaeteris was introduced when Censorinus said it was, at the earliest at the end of the sixth century, this difficult hypothesis becomes unnecessary. Also unnecessary becomes the hypothesis of Dinsmoor[4] that the idea of the solar year of 365 days and months of 30 days came to Thales from Egypt,[5] that operating with the difference of 11 days between that 365 and the lunar year of 354 an octaeteris of 2920 days was first constructed with 3 intercalary months (29+30+29=88), that this first was improved by Aphrodisius[6] with the addition of one day to make 2921, and that this was in turn improved by the addition of one day to make the 2922 of Geminus. If the octaeteris was first evolved by astronomers for their own use at the end of the sixth century when they themselves had enough knowledge of the phenomena to deal with the periods accurately, they could certainly have devised the octaeteris from scratch, once the desirability of doing so had presented itself. I should assume, in these circumstances, that prior to the discovery of the octaeteris, civil calendars were controlled as purely lunar calendars, with intercalation imposed *ad hoc* as necessary to keep the seasons straight, just as they were controlled after the octaeteris, so far as the evidence shows.[1]

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[1] *Abh. Berl. Akad.*, 1904, p. 8, noted in Diels-Kranz^5 Vol. I, p. 42, note 12.

[2] As does Diels-Kranz^5 *ibid.*, placing him around 520: "Verbesserung der Rechnung einige Oktaeteriden verstrichen". But this is not very convincing; see below.

[3] Although in Censorinus' account, the octaeteris is achieved by doubling the doubled dieteris, (for a total of 4 intercalary months, against the proper number of 3 in Geminus' octaeteris) Censorinus does not give the actual number of months in the octaeteris of which he writes, and is, I should judge, writing of the true octaeteris, and the doubling of which he writes describes the approximate means of arriving at the cycle in his judgement.

[4] *Archons*, pp. 304–5. Dinsmoor admits that "we have no actual evidence."

[5] This is partly attested: the 365 days is from Diog. Laert. I,27, the 30 days comes from Diog. Laert. statement (I, 24) that Thales was the first to call the last day of the month the thirtieth. Against Thales' Egyptian contacts, cf. D.R. Dicks, *ClQuart.* 9, 1959, pp. 304ff.

[6] Whoever he was, if he was. Censorinus, 19, reports that *Aphrodisius* (devised a year of) *CCCLXV et partem diei octavam* ($365^{1}/_{8}$). Jahn (ed. Censorinus, p. 57) points out that he is not attested elsewhere, and that the text may be either an error of Censorinus or his compilers. Jahn raises the possibility (not really a likely one, I judge) that Adrastus of Aphrodisias, of the middle of the second century of our era, is meant. With Aphrodisius totally undatable, and perhaps a ghost, I am reluctant to assign him a specific and detailed (and unattested) role in the development of the octaeteris.

The octaeteris of the precise form described by Geminus was not necessarily the only octaeteris used by the astronomers. Indeed, Geminus himself admits that the octaeteris will work regardless of which years are intercalary, so long as the number of intercalations is preserved. Censorinus mentions as propounders of octaeterides with different organizations of intercalary months Harpalus (cf. above p. 39), Nauteles (unknown), Menestratus (unknown[2]), and Dositheus (third century B.C., cf. *RE* V 1607–8). In addition to these, there seems to have been experimentation with other forms of cycles, even preceding the 19 year cycle of the latter fifth century, and Censorinus, 18, 8, attributes one to Philolaus, *est et Philolai Pythagorici annus ex annis quinquaginta novem, in quo sunt menses intercalares viginti et unus*, and one to Democritus, et *Democriti ex annis LXXXII cum intercalariis perinde viginti octo*,[3] which may have just preceded, or even have been roughly contemporary with, the cycle of Meton. In Philolaus' cycle there would have been 729 months, and Philolaus' year was 364½ days long according to Censorinus 19. Dinsmoor suggested[4] that Philolaus' system may have been more concerned with numerical perfection ($3^3 \times 3^3 = 729$) than with astronomical accuracy, and the cycle of Democritus must be reported wrongly by Censorinus (see note 3).

Another late cycle was that of Oenopides,[5] which, like that of Philolaus, was 59 years in length. Although Censorinus does not mention the cycle itself, he tells us (19,2) that Oenopides' year was 365 22/59 days in length, and Aelian[6] reports that

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[1] See below, p. p. 52–55. The evidence of other sources to support early octaeterides seems to me to be very flimsy. Ginzel (II, p. 377) mentions some games of 8 year periodicity, and mythical periods of 8 years, as Apollo's service to Admetus, the uncertainly understood ἐννέωρος of Minos with Zeus in *Od.* XIX 178–9, which one must press very hard to connect with an octaeteris; similarly, that Plut. *Agis* 11 reports that every ninth year the ephors watched for a shooting star as an indicator of a kingly offense hardly attests an octaeteris, even if an event connected with Agis in the third century can be pushed back to a custom four or more centuries old.

[2] Jahn speculates that this may be a misreading for Menecrates.

[3] Dinsmoor, *Archons*, p. 308, points out that a cycle of 82 years with only 28 intercalary months would be far too short of intercalary months. Dinsmoor suggests that Democritus may have invented a cycle of 75 years, i.e. 59 years like that of Philolaus and Oinopides (q.v.) + a double octaeteris; 59+16 = 75. A period of 75 years would require the 28 intercalary months of Censorinus, but of course, Dinsmoor's solution cannot be demonstrated; whatever the actual case, it would seem that something has gone wrong with the text or with the information of Censorinus here.

[4] *Archons*, p. 308.

[5] Reported by Proclus, *in Eucl.* 65,21 (Diels-Kranz[5] Oinopides A 1) to have been a little younger than Anaxagoras; to have taught about the time of the end of the Peloponnesian War (Diels-Kranz[5] Oinopides A 1 a).

[6] *Var. Hist.* X,7 (Diels-Kranz[5] Oinopides A 9).

Oenopides set up at Olympia a bronze tablet, writing on it an astronomical 59 year cycle which he called the great year.[1] The evidence seems to me quite convincing that the decades before Meton were filled with activity by the astronomers,[2] all working at perfection of a system of time reckoning of sufficient accuracy and fidelity to the phenomena to permit astronomers to use it as a basis of record-keeping and of astronomical research. As Geminus pointed out in his concluding remarks about the octaeteris, there were residual errors, and the cycles attributed to the various astronomers must have been attempts to correct those residual errors. The brilliant solution was the nineteen year cycle which Geminus mentions at the end of the discussion of the octaeteris.

The Nineteen Year Cycle and the Callippic Cycle

At the conclusion of his discussion of the octaeteris, Geminus explains why the octaeteris was not entirely satisfactory. Using the figure of Hipparchus for the true length of the lunar month, 29.5305941 days,[3] in a bracketed passage the text argues that the true length of the lunar month requires 4 intercalary days in a 16 year period, instead of the 3 inserted by the doubled octaeteris. This comment, although relevant to the error of the octaeteris, is not the only note of significant variance with the phenomena in that cycle. Geminus points out that with the lunar year actually approximately $354\frac{1}{3}$ days in length (rather than precisely 354), the differential between lunar and solar years is 10 11/12 days (rather than precisely $11\frac{1}{4}$), so that there are only $87\frac{1}{3}$ days differential in an 8 year period, and this differential does not make up three whole months, as had been provided by the octaeteris. For this reason there should not be three whole intercalary months in 8 years, and Geminus contrasts the effects of 8 year and 19 year cycles: in 19 years there are 7 intercalary months, to the effect that in eight 19 year cycles (152 years) there are 56 intercalary months, while in nineteen octaeterides (152 years) there are 57 intercalary months. Thus in 152 years, the octaeteris is too long with respect to the solar year, by one full month.

Geminus then describes the workings of the 19 year cycle:

Διόπερ ἐπειδὴ διημαρτημένην εἶναι συνέβαινε τὴν ὀκταετηρίδα κατὰ πάντα, ἑτέραν περίοδον συνεστήσαντο τὴν τῆς ἐννεακαιδεκαετηρίδος οἱ περὶ Εὐκτήμονα καὶ Φίλιππον καὶ Κάλλιππον ἀστρολόγοι. παρετήρησαν γὰρ ἐν τοῖς ιθʹ ἔτεσι περιεχομένας ἡμέρας ,ϛϡμʹ, μῆνας δὲ σλεʹ σὺν τοῖς ἐμβολίμοις. ἄγονται δὲ ἐν τοῖς ιθʹ ἔτεσι μῆνες ἐμβόλιμοι ἑπτά. [γίνεται οὖν ὁ ἐνιαυτὸς κατ' αὐτοὺς ἡμερῶν τξεʹ καὶ εʹ ἐννεακαιδεκάτων.] ἐν δὲ τοῖς σλεʹ μησὶ κοίλους ἔταξαν ριʹ, πλήρεις δὲ ρκεʹ, ὥστε μὴ ἄγεσθαι ἕνα καὶ ἕνα κοῖλον καὶ πλήρη, ἀλλὰ καὶ δύο ποτὲ κατὰ τὸ ἑξῆς πλήρεις. τοῦτο γὰρ ἡ φύσις ἐπὶ τῶν φαινομένων ἐπιδέχεται πρὸς τὸν τῆς σελήνης λόγον, ὅπερ ἐν τῇ ὀκταετηρίδι οὐκ ἐνῆν. ἐν δὲ τοῖς σλεʹ μησὶ κοίλους ἔταξαν ριʹ δι' αἰτίαν τοιαύτην. ἐπεὶ μῆνες ἄγονται σλεʹ ἐν τοῖς ιθʹ ἔτεσιν, ὑπεστήσαντο τούτους πάντας τριακονθημέρους· καὶ συνάγονται ἡμέραι ,ζνʹ. [ἔδει δὲ λέγεσθαι ριʹ κοίλους. δι' ἣν αἰτίαν τῇ ἐννεακαιδεκαετηρίδι ἡμέραι γίνονται κατὰ σελήνην ,ϛϡμʹ.] πλεονάζουσιν οὖν τριακονθημέρων ἀγομένων πάντων τῶν μηνῶν αἱ ,ζνʹ ἡμέραι τῶν ,ϛϡμʹ ἡμερῶν· <καὶ> γίνονται <ἡμέραι ριʹ.> ριʹ μῆνας οὖν ἄγουσι κοίλους, ἵνα ἐν τοῖς σλεʹ μησὶ συμπληρωθῶσιν αἱ τῆς ἐννεακαιδεκαετηρίδος ἡμέραι ,ϛϡμʹ. ἵνα <δὲ> ὡς ἐνδέχεται μάλιστα δι' ἴσου ἡ τῶν ἐξαιρεσίμων ἡμερῶν γένηται πραγματεία, ἐμέρισαν τὰς ,ϛϡμʹ ἡμέρας εἰς ριʹ· γίνονται οὖν ἡμέραι ξγʹ. δι' ἡμερῶν ἄρα ξγʹ ἐξαιρέσιμον τὴν ἡμέραν ἄγειν δεῖ ἐν ταύτῃ τῇ περιόδῳ. οὐδὲ γίνεται ἐξαιρέσιμος ἡ τριακὰς διὰ παντός, ἀλλ' ἡ διὰ τῶν ξγʹ ἡμερῶν πίπτουσα ἐξαιρέσιμος λέγεται.

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[1] Theo. Smyrn. p. 322 ed. Martin (Diels-Kranz^5 Oinopides A 7) reports that Eudemus credited Oenopides with being the first to discover the inclination(?) of the ecliptic and the great year.

[2] Dinsmoor, *Archons*, p. 307, on the basis of Avienus' statement (cf. above, p. 39) that Harpalus produced a cycle that brought sun and moon into agreement after nine winters, and because Censorinus 19 states that Harpalus had a year of 365 days and 13 equinoctial hours, suggested that the octaeteris credited to Harpalus by Censorinus (18) must have been a triple octaeteris of 8773 days, averaging $2924\frac{1}{3}$ days (i.e., years of $365^{13}/_{14}$ days) in each eight year period. Dinsmoor suggested that in such a cycle, there would have been 287 months, of which 9 were intercalary, i.e., 15 ordinary years, 8 of 354 days and 7 of 355, with 9 intercalary years of 384 days. Although there is no evidence for any of this, if Dinsmoor is right, such a cycle would be another attempt to improve upon the octaeteris.

[3] See p. 38, note 1.

'Εν δὲ τῇ περιόδῳ ταύτῃ δοκοῦσιν οἱ μὲν μῆνες καλῶς εἰλῆφθαι καὶ οἱ ἐμβόλιμοι συμφώνως τοῖς φαινομένοις διατετάχθαι, ὁ δὲ ἐνιαύσιος χρόνος <οὐ> σύμφωνος εἴληπται τοῖς φαινομένοις. ὁ γὰρ ἐνιαύσιος χρόνος ἐκ πλειόνων ἐτῶν παρατετηρημένος συμπεφώνηκεν ὅτι ἐστὶν ἡμερῶν τξεʹ δ^{ου}, ὁ δὲ ἐκ τῆς ἐννεακαιδεκαετηρίδος συναγόμενος ἐνιαυτός ἐστιν ἡμερῶν τξεʹ ἐννεακαιδεκάτων εʹ. πλεονάζουσι δὲ αὗται τῶν τξεʹ δ^{ου} ἡμέρας ἑβδομηκονθέκτῳ. δι' ἣν αἰτίαν οἱ περὶ Κάλλιππον γενόμενοι ἀστρολόγοι διωρθώσαντο τὸ πλεονάζον τῆς ἡμέρας καὶ συνεστήσαντο τὴν ἑκκαιεβδομηκονταετηρίδα συνεστηκυῖαν ἐκ τεσσάρων ἐννεακαιδεκαετηρίδων, αἵτινες περιέχουσι μῆνας μὲν ϡμʹ, ὧν ἐμβόλιμοι κηʹ, ἡμέρας δὲ β̈ ,ζψνθʹ. τῇ δὲ τάξει τῶν ἐμβολίμων ὁμοίως ἐχρήσαντο. καὶ δοκεῖ μάλιστα πάντων αὕτη ἡ περίοδος τοῖς φαινομένοις συμφωνεῖν.

Geminus' description of the cycle is clear and unconfused. The devisers of the 19 year cycle found that in 19 (tropical) years, there are 6940 days (with the length of the year figured at $365\ {}^{1}/_{19}$ days), and in the same period there are 235 months, of which 7 are intercalary (i.e. $235 \times 29.5305941 = 6939.6896135$ would render the result of multiplication with the length given by Geminus). Of the 235 months, 110 were hollow and 125 full because: 235 months of 30 days would yield 7050 days, q.e.d., to obtain the total 6940, 110 must be deducted, to make 110 months hollow. To obtain even elimination of the 110 days, 6940 was divided by 110, to produce the quotient 63, so that every day after an interval of 63 was dropped, rather than having the 30th day of a hollow month eliminated.

One more correction was necessary, as Geminus tells us, to make this cycle accord with the phenomena. The year of $365{}^{1}/_{19}$ days was ${}^{1}/_{76}$th of a day too long, with respect to the (tropical) year. In order to eliminate this excess, Callippus and his school constructed a longer cycle, multiplying the 19 year cycle by 4, to yield 940 months (235×4) of which 28 were intercalary (7×4), to total 27, 759 days in the

76 years (= (6940 × 4) — 1). That is, in the whole 76 year period, Callippus eliminated 1 more day than the 19 year cycle would have eliminated, doubtless by having 1 month hollow which would have been full in the 19 year cycle; perhaps the last day of the last year was eliminated.

With the data from Geminus, combined with information available about astronomical observations, we can determine a great deal about the actual workings of these cycles. The following questions must be resolved, and the resolutions therefrom provide the guidelines for the reconstructions of the calendars: (1) what was the epoch, i.e., beginning date for each of the cycles; (2) what was the actual rule for determining the years into which intercalary months were to be inserted; (3) was the recurring day 64 actually dropped from the 19 year cycle, and was the same rule followed in the Callippic cycle? The questions have been investigated by Fotheringham[1] and Van der Waerden[2], and the discussion here follows their lines of argument for the most part.

The evidence for establishing the epoch is plentiful and consistent. Diodorus reports (XII, 36) that in the archonship of Apseudes (and Ol.86,4 = 433/2 B.C.) on Skiriphorion 13, Meton published his 19 year cycle. Ptolemy (*Almagest* I, p. 205 ed. Heidberg) confirms the archonship and makes clear the significance of the date: Meton observed the summer solstice ἐπ ’Αψεύδους ἄρχοντος ’Αθήνησι κατ’ Αἰγυπτίους Φαμενὼθ κα′ πρωίας. These two testimonia are supported by a full statement of the beginning of a cycle in the famous Milesian parapegma:[3]

> [θ]ερινῆς τρο[π]ῆς [γε-]
> νομένης ἐπὶ ’Αψεύδους
> Σκιροφοριῶνος ι̅γ̅, ἥ-
> τις ἦν κατὰ τοὺς Αἰγυ-
> πτίους μία καὶ κ̅
> [τ]οῦ Φαμενώθ, ἕως
> [τῆ]ς γενομένης ἐπὶ
> [Πολ]υκλείτου Σκι-
> [ροφορι]ῶνος ι̅δ̅, κα-
> [τὰ δὲ τοὺ]ς Αἰγυπτί-
> [ους] τοῦ Παυ]νὶ τῆς ι̅α̅,
> [κατὰ δὲ τὸ Μιλ]ήσιον

This text gives us the beginning of a cycle on Skirophorion 13 = Phamenoth 21 of the archonship of Apseudes, and also that the summer solstice fell on that date. The evidence is conclusive that the cycle was to have begun on Skirophorion 13 = Phamenoth 21, Apseudes, and that the astronomical phenomenon marking the epoch was the summer solstice. If we adduce all the data we may obtain from astronomical calculation, without attempting to fit the evidence to any known civil calendar, it is clear that the evidence of the ancient astronomical texts is in perfect accord with the phenomena: Skirophorion 13 was Egyptian Phamenoth 21, and Phamenoth 21 was 27 June in 432;[1] the end of the year of Apseudes (i.e., Skirophorion) was in 432 (Diodorus), and the summer solstice of that year was on 28 June, julian, in the morning.[2] All the data fit. The Greek day Skirophorion 13, of 432 B.C. which coincided with Phamenoth 12 (= 27 June) was the day in which the summer solstice fell in that year;[3] that day was the day on which the cycle of the Milesian parapegma, Meton's and Euctemon's cycle, began.[4]

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[1] J. K. Fotheringham, "The Metonic and Callippic Cycles," *Monthly Notices of The Royal Astronomical Society* 84, 1924, pp. 383–392.

[2] B. Van der Waerden, "Greek Astronomical Calendars and Their Relation to the Athenian Civil Calendar," *JHS* 1960, pp. 168–180.

[3] H. Diels and A. Rehm, "Parapegmenfragmente aus Milet," *Sitzungsberichte der K. Preußischen Akad. d. Wiss. Berlin*, 1904, pp. 92ff.

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[1] The easiest calculation to find 21 Phamenoth in 432 is an extrapolation backwards from the tables of Skeat, *Reigns of the Ptolemies.*

[2] Fotheringham, *op.cit.*, p. 383; calculated by Ginzel II, p. 394, from Schram, as 28 June 2h 36m. Dinsmoor's datum of 4 P.M. (p. 312) must have been taken from Ideler I, p. 326.

[3] From this, it would seem that Meton's year was to begin on the day which *included* the summer solstice, i.e., on the evening before the summer solstice, a conclusion which Fotheringham, *op.cit.*, p. 385, reached as applying to all the years of the Metonic cycle.

[4] This date cannot have been an observed date, i.e., a date in a month which began with first visibility of the crescent. My own calculation shows first visibility for 16 June, with moonset after sunset 0.36 hours, so that the 13th of that month would have been 28 June, rather than 27. Fotheringham's investigations brought the conclusion (*op.cit.*, p. 385) that Meton's months were to have begun on the sunset *before* mean new moon, exactly the structure indicated by the calculation for 1 Skirophorion, so that 13 Skirophorion was a calculated date. Meton's Skirophorion was calculated to begin the evening before conjunction (which was 16 June), i.e. the month began on 15 June, and, in that calculated month, the year began on 13 Skirophorion, the day within which the solstice occurred. The only problem presented by this is the περὶ τὴν ἀρχὴν τῆς τοῦ Φαμενὼθ κα′, of Ptolemy, which must be taken to refer to the time of day generally, rather than the specific point (cf. the note of Manitius, Deutsche Übersetzung, Ptolemaeus, *Handbuch der Astronomie* I, p. 144).

That Meton's cycle began on 27 June 432 is now generally accepted. There is less agreement about the interpretation of the Milesian parapegma. That text, discussing the elapsed time between the solstice of 432 and that of the year of Polykleitos, has been differently interpreted. The general belief has been that the 14 Skirophorion = 11 Payni, archon ... YKLEITOS is to be dated in 109 B.C. 26 June (erroneously 27 Ginzel, II, p. 424, corrected by Dinsmoor *Archons*, p. 312, n. 3). There is a great deal of evidence to support that: (a) Apollodorus (*F.Gr.Hist.* 244,56) indicates 19 years between Lykiskos, securely dated to 129/8 (see below, p. 220) and Polykleitos, which, by exclusive reckoning, would put the end of Polykleitos' year, Skirophorion, into 109, ca. June; (b) Polykleitos fits in 110/09 by the secretary cycle (below, p. 221); (c) if Polykleitos is dated in 110/09, the year which began at the summer solstice of 26 June of that year began a 19 year cycle. Against this is the view of Van der Waerden, that (a) in 109 B.C., according to the Callippic cycle, Payni 11 = Skirophorion 12 (not 14, as in the inscription) and according to the cycle of Euctemon (i.e., Meton), the coincidence would be 11 Payni = 8 Skirophorion; (b) with new moon on June 14 at about 8:40 A.M., the exact lunar date of June 26 would be month XII day 13 in a Callippic scheme which began the month on the evening following mean conjunction (see Fotheringham, *op.cit.*, p. 390) i.e., Skirophorion 1 = June 14; or, in an observed month, the lunar equivalent of 26 June would equal month XII day 11 (Skirophorion 1 = 16 June); or, in an archon's month, June 26 would = Skirophorion 11 or 12. (c) in 106 B.C., Payni 11 did equal Skirophorion 14 according to the calendar of Callippos, and, in that same year, summer solstice fell on that very date. From all this, and primarily because Van der Waerden could not find a reasonable explanation for the date 14, he suggested that 106 would fit very well, and that if this were correct, the writer of the parapegma was using the Callippan calendar.

This is very convincing, but would involve re-dating Polykleitos, who seems very well dated. Indeed, the dilemma seems to be one of contrasting a convincing argument pointing to 106 with compelling evidence for 109. My own solution, tentatively, is to opt for 109, With the epoch established, other evidence helps us to establish the rule of intercalation. Fotheringham, p. 386, takes the only evidence available for this purpose, and adduces some conclusions with evidence from three eclipses:

Almagest, Heib. I, p. 340, Nab. 366 Thoth 26/27 = 23 Dec. 383 B.C., archon Phanostratos, Poseideon
Almagest, Heib. I, p. 341, Nab. 366 Phamenoth 24/25 = 18 June 382 B.C., archon Phanostratos, Skirophorion
Almagest, Heib. I, p. 342, Nab. 367 Thoth 16/17 = 12 Dec. 382 B.C., archon Euandros, Poseideon proteros

These observations were made at Babylon, and as Fotheringham points out, to be useful to Greeks they must have been converted into Greek dates, i.e., at this time before the Callippan reform, into the Metonic calendar. They would then have been converted into Egyptian dates by Hipparchus, thus giving us dates useful for determining the exact julian dates meant. From these three dates, Fotheringham noted that the first two fall in the 50th year from the first Metonic year, i.e., in year 12 of the third cycle. Computation from the month names shows that in the 11 years of cycle 3 there must have been 136 months (2 cycles = 470 months; total months from beginning of cycle 1, 606–470 = 136). With 136 months in the first 11 years of a cycle, we may conclude that 4 years were intercalary. Then, elapsed time between the months shows no intercalation in year 12, while mention of Poseideon proteros, implying a second, intercalary month, shows that year 13 was intercalary. Fotheringham then drew up a table of beginning dates for each year of the 19 year cycle (p. 387) showing: elapsed dates from beginning, Metonic date of New Year's day, and julian date of New Year's day. Presuming that the Metonic system would try to keep New Year's day as close as possible to the solstice, and with the knowledge that 4 years of the first 11 were intercalary while year 12 was not, and 13 was, Fotheringham concluded that in the Metonic system, years 2, 5, 8, 10, 13, 16 and 18 were the intercalary years. Thus the Metonic system as described by Geminus and expanded by Fotheringham worked by the following rules: take 19 years, and in

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pace Van der Waerden, with the suggestion that 14 Skirophorion comes from a habit inculcated by the Metonic cycle of beginning the month with the sunset before new moon, i.e., here Skirophorion 1 would be 13 June, so that 14 Skirophorion = 26 June = 11 Payni. The Milesian parapegma could then not be seen as using the Callippan cycle, but at least we would have an explanation of the 14.

I am not very satisfied with this explanation, but it at least permits us to follow the evidence for Polykleitos in 110/09. However, it is worth noting that in 109, the summer solstice fell on 25 June, and, if we are arguing for the month beginning before mean new moon (i.e., Metonic style) it is surprising to find the Metonic practice of beginning the year before the solstice (see above) not followed here. There may be no solution to the problem at present, and, in any case, it is worth noting Dinsmoor's proposal, which, although I cannot accept it, does offer yet another alternative. Dinsmoor (*Archons* pp. 407–423) suggested on the basis of his attempt to reconcile the Athenian civil calendar with the astronomical calendars that Hipparchus' 304 year cycle (q.v.) so adjusted the Metonic cycle that the relationship reflected by the parapegma was brought about. While a Hipparchic cycle may lie behind the parapegma, another cycle also could, and Dinsmoor's use of civil dates for his demonstration seems to me to be a flaw in any argument for the adoption of the Hipparchic system. (See below, pp. 49–50).

years 2, 5, 8, 10, 13, 16, 18 insert intercalary months; let each month have 30 days, but remove every 64th day by passing it over.

Fotheringham then turned to an examination of the Callippic cycle. The only information given by Geminus is the length of the cycle, and that the intercalation scheme was like that of the Metonic cycle. Fotheringham examined the following dates in the Callippic cycle, and found that, apart from two manuscript errors, all pointed to the summer solstice of 330 as the epoch for Callippus' cycle; I give only those dates which produce useful data:

Almagest Ed. Heib.	Yr. Call.	Greek Date	Era Nab.	Egyptian Date
II 32	i 36	25 Poseideon	454	16 Phaophi = 21 Dec 295
II 28	i 36	15 Elaphebolion	454	5 Tybi = 9 Mar 294
II 25	i 47	8 Anthesterion	465	29 Hathyr = 29 Jan 283
II 29	i 48	25 Pyanepsion	466	7 Thoth = 8 Nov 283
I 206	i 50	Callippus was 44th year after death of Alexander the Great and 152 years after the archonship of Apseudes. = 280		
I 344	ii 54		547	16 Mesore = 22 Sep 201
I 345	ii 54	(corrected)	548	9 Mecheir = 19 Mar 200
I 346	ii 55		548	5 Mesore = 12 Sep 200
I 204	iii 32	178th yr. post Alex's death		27 Mecheir = 24 Mar 146
I 477	iii 37		607	2 Tybi = 27 Jan 141
II 15	iii 50	265 years before Antoninus Pius		= 129/8
I 363	iii 51		620	16 Epeiph = 5 Aug 128

Not only do these dates demonstrate that the epoch for the Callippic cycle was 330, but also, first four of these observations, made by Timocharis, support the view that in the Callippic cycle every 64th day was omitted. Counting backwards from each of these dates on the Greek calendar, eliminating every 64th day and using Metonic intercalation, we reach the same epoch date, June 28/29, in each of the four cases. This not only confirms the view that the 64th day was the day eliminated, but also supports the view that Geminus was correct in his statement that Callippus used the same intercalation scheme as did Meton. Finally, since in observations three and four we find that Pyanepsion was nine (julian) months later than Anthesterion, while in the Attic calendar they were eight months apart, we conclude that there had been a month intercalated, probably Skirophorion, the 12th month, so that in the Callippic system it was Skirophorion which was regularly intercalated.

The intercalation system of the Metonic cycle was continued without break by the Callippic. That is, the Callippic system picked up the cycle in its state in 330. The first month, Hekatombaion, of the first year of the first Callippic cycle, began on 28 June 330, which was the sunset following mean new moon, the datum used for the beginning of months in the Callippic scheme.[1] Analyzing the evidence of the four observations of Timocharis, we see that in year 36 the relationships between Poseideon and Elaphebolion with the julian calendar show them to have been, respectively, the 439th and 442nd months of the cycle, so that the first 35 years of the cycle must have had 13 intercalary months: $35 \times 12 = 420 :+ 13 = 433 :+ 6$ (Poseideon) $= 439$; $+ 3$ (Elaphebolion) $= 442$. By similar calculation, Anthesterion of year 47 would be the 577th month of the cycle, so that the first 46 years must have contained 18 intercalary years, while Pyanepsion of year 48, the 586th year, shows there to have been 18 intercalary years in the first 47 years. Continuing the Metonic scheme as Geminus says was done, and beginning the Callippic cycle in the 8th year of a Metonic cycle, (as 330 began the 8th year of a Metonic cycle) one finds the following intercalation scheme:

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[1] Fotheringham, *op.cit.*, pp. 390–391, shows by computing the mean new moon for each month of the first year of the first cycle that almost all the months began on the first sunset following mean new moon. Furthermore, Fotheringham, pp. 388, 389, examining the attribution to Callippus by the *Ars Eudoxi* of an interval of 92 days between summer sol-

Metonic	8	10	13	16	18	2	5
Callippic	1	3	6	9	11	14	17
	20	22	25	28	30	33	36
	39	41	44	47	49	52	55
	58	60	63	66	68	71	74

These conclusions of Fotheringham were accepted by Van der Waerden, *op. cit.* pp. 170ff., with the reservation that the intercalary quality of three of the years in the Metonic cycle were, to him, uncertain (p. 176). Years 2 or 3, 10 or 11, 18 or 19, may have been intercalary, and this uncertainty would carry over into the resolution of the intercalary scheme of the Callippic system.

Thus the account of Geminus seems to describe correctly, although incompletely, the Callippic system. It was, as Geminus says, a 76 year cycle of four 19 year periods, with 940 months of which 28 were intercalary.[1] And the same system of intercalary months as devised by Meton was brought over into the Callippic system in the 8th year of a Metonic cycle without missing a beat, as it were. It seems to be clear that Callippus chose to begin his cycle in a year in which Hekatombaion 1, the technical beginning of the year, would coincide with the first sunset after the summer solstice, so that the solstice itself would start off the new cycle.

The invention of the 19 year cycle has been variously credited in the sources. Meton is the popular choice,[2] whereas Geminus credits it to Euctemon, Philippus (and Callippus).[3] There is certainly no doubt of the institution of the 19 year cycle

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stice to autumn equinox, 89 days autumn equinox to winter solstice, and 90 days winter solstice to vernal equinox, finds that Callippus calculated the solstice of 330 for June 27–28. Thus his year would begin on the sunset following the solstice (i.e., beginning on 28 June) just as months began on the sunset following mean new moon.

[1] So too, Censorinus, ed. Jahn, 18, agrees that Callippus' cycle was 76 years with 28 intercalary months.

[2] By, *inter alia* Censorinus, ed. Jahn, 18,8; Diodoros, XII,36; Ptolemy, *Almagest* I, p. 205 ed. Heib., reports the observation of the solstice in the archonship of Apseudes by *both* Meton and Euctemon. Aelian, *Var.Hist.* X,7, reports that Meton set up steles, on which he wrote the solstices, and the great year of 19 years. Meton is mocked by Aristophanes, *Birds*, 991 f.

[3] Euctemon's work is not infrequently cited by Ptolemy. Philippus is less well known, and a Phaeinus is mentioned by Theophrastus, (*de signis tempestibus* 4). Cf. Ginzel II, pp. 388–390.

in 432 for astronomical purposes, and it was used for astronomical records until the refinement of Callippus. There seems to be no disagreement in the sources that the 76 year cycle, instituted in 330, was the work of Callippus.[1] These cycles made it possible for astronomers to have a calendar which would keep months in fairly close accord with the moon in individual years, and in addition would have the same named months running precisely consecutively, with identical intercalations, everywhere, so that astronomers could rely on a given date being recognized uniformly by all other astronomers. Ptolemy's frequent use of Callippic dates illustrates the application. Elapsed time could be calculated by use of these calendars, and predictions could be made in terms of them. The 19 year cycle served this 'identification' purpose as well as did the Callippic, but with the introduction of the Callippic cycle, there was greater convenience in identifying the years by numbers rather than by Attic archons (see below, pp. 195–197), and there was a closer correlation between the calendar and the phenomena.

Later Cycles

According to Censorinus 19,2, Aristarchus of Samos (ca. 275) devised a year which was 1/1623 of a day longer than that of Callippus, in a cycle (chap. 18,11) which was 2484[2] years in length.[3] There is no evidence that such a cycle was ever used by anyone in antiquity, and, to the best of my knowledge, no modern has ever suggested that it was ever put into practical application. Censorinus 18,9, mentions another cycle proposed by the significant ancient astronomer Hipparchus, of 304 years with 112 intercalary months. But, although Hipparchus is mentioned frequently by Ptolemy, his cycle is reported nowhere but in Censorinus, and Ginzel (II,391) judged that it never moved out of theory into practical application to a calendar. Dinsmoor's judgement, connecting the Hipparchic cycle with the Milesian parapegma and some Attic dates, seems to me unlikely.[4] Apart from the fact that one would expect that if the Hipparchic cycle ever had any significant use, it would have been reported more extensively, and would not just have been listed along with a great number of proposals, it would seem that had it been used astronomically, it would have made its appearance in the text of Ptolemy. It nowhere appears. Indeed, wherever we encounter astronomical calendars in the text of Ptolemy they are Metonic or Callippic,[1] and indeed, the record of Hipparchus' own observations are expressed in terms of the Callippic cycle.[2] This last is the most telling point against a hypothesis of the use of an Hipparchic cycle of 304 years. It would seem most unlikely that the records of Hipparchus' own observations would have been recorded in the cycle of his predecessor if Hipparchus had devised a cycle which had been put into use by astronomers.[3] Almost as telling against confidence in the institution of the Hipparchic cycle is the fact that there are instances of observations in the period after Hipparchus when citation of a year within the 304 year cycle, as years within the 76 year Callippic cycle were cited, would have been much easier than the method used, for example, citation of regnal years.[4] The conclusion must be that if Hipparchus' cycle was anything more than a theoretical presentation of the periodicity of the phenomena, that is, if it was even schematized as a calendar by its inventor, that calendar scheme was never adopted generally, or indeed, had any such use as would have prevented it from disappearing without trace or influence in the record of astronomical activity. The conclusion must be that the only Greek calendars used by astronomers were the 19 year cycle and the Callippic 76 year cycle, both of which used Greek month names and both of which were designed as lunar calendar cycles with accommodation both to the true length of the lunar month, and with a structure arranged to keep the beginning of the year roughly constant with respect to the tropical year.

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[1] Not only does Ptolemy frequently cite Callippic dates, but Simplicius, *Comm. in Arist. de Cael.* II,12 (Heib. p. 497) reports the Callippan improvement of the Eudoxan system of spheres (see above, p. 32) a refinement in theory which parallels the refinement of practical application to the calendar.

[2] Tannery, *Mem.Soc. des Sciences phys. et nat. de Bordeaux* IV, 1888, pp. 79–96, suggests that this figure is an error for 2334, to reconcile the figures.

[3] All sorts of long cycles are mentioned in this passage: that of Aretes of Dyrrhachium, 5552; Heraclitus and Linus, 10,530; Dion, 10,884. Similarly, Hipparchus appears along with Philolaus, Callippus, Democritus, as inventors of cycles.

[4] Dinsmoor, *Archons*, Chapter XX, proposes in detail the application of the Hipparchic system, working out, e.g., the length of the solar year as 365.24671 days, and the lunar month as 29,530585, and arguing that the figures in the Hipparchic cycle are just four times the figures in the Callippic, so the Hipparchic system might have been one day shorter than the Callipic to eliminate the extra day caused by Callippus' cycle. This is, of course, theoretical, and my conclusion against it is based not only on the arguments above, but on the discussion arguing against the application of astronomical cycles to civil years (see below, pp. 52–55) on which Dinsmoor depends in his argument.

That is not to say that the only calendars used by the astronomers were these Greek astronomical cycles. Rather the converse was true. The calendar of Dionysius, which began with the summer solstice of 285, 26 June,[5] was constructed primarily as an adaptation of the Egyptian calendar. There were months of 30 days each with epagomenal days to make up the rest of the year, 5 in years 1, 2 and 4, and 6 epagomenal days in year 3,[6] to make up a solar year of 365¼ days, basically the kind of structure envisioned by the Canopus Decree (*OGI* 56).

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[1] E.g., Metonic, *Almagest* ed. Heib. I, pp. 340–342; see above, pp. 46; Callippic *Almagest* ed. Heib. I, pp. 344–346; above, pp. 47.

[2] *Almagest*, Heib. I, 199, bis, and I, 526; (cf. also Heib. I, p. 135).

[3] It is worth noting that there is no mention of the 304 year cycle in Ptolemy's discussion of Hipparchus' study of the length of the year, and that his statement of Hipparchus' conclusion about the length of the month, 29.5305941 days, is not the figure which Dinsmoor arrives at on the basis of the 304 year cycle.

[4] 129/8 B.C. is denoted as '265 years before Antoninus Pius' in *Almagest*, ed. Heib. II, p. 15, in addition to having its Callippic year noted, just as 139/40 A.D. is described as the third year of Antoninus, and the 463rd year after the death of Alexander the Great.

[5] See below, p. 52.

[6] For discussions of the calendar of Dionysius, see Boeckh, *Vierjährige Sonnenkreise der Alten*, 1863, pp. 286ff.; Kubitschek, RE s.v. Aera, p. 619; Manitius, Transl. *Almagest*, 1963, II, Anhang, Anmerk. 6, pp. 407–408.

The months themselves were named after the zodiacal signs, and most are attested by Ptolemy.[1] The names (the unattested italicized) are: *Karkinon*, Leonton, Parthenon, *Chelon*, Skorpion, *Toxon*, Agon, Hydron, *Ichthyon*, *Krion*, Tauron, Didymon, clearly using the style of Greek month nomenclature to modify the signs into month-names.

The months of the Syro-Macedonian calendar (q.v.) were used extensively for astronomical purposes, as were the Egyptian months. But these two calendars were not designed specifically for the purposes of the astronomers, as were the Greek cyclical calendars. Rather, they were used for reference of observations because they were generally known and reasonably reliable calenders. By the time of Ptolemy the Egyptian calendar had been adapted to the 365¼ day julian calendar and was reasonably close to the phenomena, as too were most of the calendars of the Eastern Roman Empire.

4. *Astronomical Denomination of Years*

We have already seen (p. 49) how the Callippic cycle was used for the designation of specific years: the number of the cycle and the number of the year within that cycle were both given. The frequency of reference to Callippan years suggests that they were extensively used by Greek astronomers for the designation of specific years. The Callippan years were probably the first Greek astronomical year numeration, and the designations of observations in the period before Callippus by the names of archons[2] shows that prior to Callippus only archon designations seem to have been in use. This is just what we should expect from the development of the counting of years in historical chronology. In the fourth century Philistus first used enumeration of years with Olympiad synchronisms, and it was not until Timaeus that we have indication of use of Olympiad numbers in history (See Olympiads). So it was not until the period of Callippus that archon-named years were beginning to be abandoned, and it is no surprise to find that it is first with Callippic cycles that archons are dropped and numbers used for astronomical reckoning.

Oddly enough, Olympiad years never were adopted for counting by astronomers, so far as we know. If Ptolemy is any guide to general practice, two eras were commonly used to designate years. The era of Nabonassar, which had been used by Babylonian astronomers, understandably found acceptance by Greek astronomers, particularly when quoting Babylonian observations, and it is the era of Nabonassar which most frequently denotes years. Ptolemy's frequent references[3] to the accession of that king of Babylon as the beginning of the era give the date of accession as

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[1] Cf. *op.cit.*, index, s.v. Dionysius.

[2] *Almagest*, Heib. I, p. 340–342.

[3] Cf. the index to Manitius' translation of *Almagest*, s.v.

1 Thoth[1] and the celestial phenomena associated with the year and date show that the julian day meant was 1 Thoth = 26. February 747.

Similarly, there was dating by "years from the death of Alexander", the so-called Era of Philip Arrhidaios.[2] The beginning year of that era was 324/3, the year in which Alexander actually died (10/11 June), but for calculation the year was the Egyptian year 1 Thoth (= 12 November 324) – 5 Epagomenal (= 11 November) 323.

The era of Dionysius began with the first year of the co-regency of Philadelphus, Ptolemy II, with his father, in 285, the year which was year 1 of the reign in the revised calculation.[3] This may be demonstrated, *inter alia*, by the fact that year 13, Dionysius = 476 Nabonassar (*Almagest*, Heib. II,352) just as year 13 of Philadelphus = 476 Nabonassar (p. 310/11), as well as by the fact that the eras given as coordinate to the Dionysian years (Cf. Manitius, transl., index, s.v. Dionysius) all point to 285 as the first year of that era.

Not infrequently dates in any of these astronomical eras were given in conjunction with other eras, so that one may have a Callippic year date together with a Nabonassar date and/or a Philippic date, or similarly, a Dionysian date together with a Nabonassar or Philippic date. I know of no examples of Dionysian and Callippic dates together. It would appear that by the time of Ptolemy, the eras which were used by the astronomers were either Nabonassar or Philippic, and the former possibly more commonly known, so that dates of observations recorded in the systems of the earlier astronomers like Callippus or Dionysius were most conveniently reduced to Nabonassar or Philippic terms for convenience. Callippic and Dionysian eras had been used in earlier times and were still known and manipulable, but in all probability were no longer used for records in later times.

5. Astronomical and Civil Calendars

There have been many attempts to establish a relationship between astronomical calendars on the one hand and civil calendars on the other,[4] and perhaps the most elaborate is the relatively recent study of Dinsmoor, *Archons*, pp. 297–440, with tables of Metonic cycles from 432–109 B.C. Since, with Van der Waerden, I do not believe that the astronomical cycles were used to regulate the archon's[5] or civil calendar, I shall not set forth Dinsmoor's conclusions here, but rather will give my reasons for separating astronomical from civil calendars. Van der Waerden set out four reasons for his differing from Dinsmoor's view, along with seven difficulties raised by an attempt at reconciliation between astronomical cycles and the Athenian calendar:[1]

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[1] E.g., *Almagest*, Heib. I, 257, 325, 462; II, 294, 315, 357, 391, 425. The Egyptian system of dating reigns by beginning year 1 with the Thoth 1 preceding the accession doubtless has been responsible for the selection of Thoth 1 here.

[2] Cf. Manitius, transl. *Almagest*, s.v., Alexander.

[3] Cf. A. Samuel, *Ptolemaic Chronology*, Münch. Beitr. z. Papyrusforsch. u. antiken Rechtsgeschichte 43, 1962, pp. 25ff.

[4] For a survey of the results of different systems, as well as his own proposals, see Ginzel II, pp. 426–491, an examination of Attic reckoning, with bibliography at the end.

[5] See p. 58 for terminology. I use *archon's* and *festival calendar* interchangeably.

1. Athenian intercalation was irregular, whereas Euctemon's (i.e., the 19 year cycle) had regular intercalation in specified years.
2. In the 19 year cycle every 64th day was omitted regardless of its number in the month, whereas this could not be done in a festival (i.e., archon's) calendar.
3. In the festival calendar days could be intercalated, whereas there was no intercalation of days in the 19 year cycle.
4. In the 19 year cycle the month began on the day of mean conjunction, whereas Athenian months began with first crescent visibility.
5. If the 19 year and the Callippic cycles had been intended for the Athenian calendar, the intercalary month ought always to have been Poseideon, the month which was intercalary at Athens.

The remainder of Van der Waerdon's arguments depend upon the demonstrable variance in the archon's calendar,[2] and the reasons for rejecting Dinsmoor's hypothesis seem cogent to me. The most telling of these arguments are those which cite the demonstrable irregularity of the archon's calendar, in particularly the remark of Aristophanes about the confusion in the calendar, which certainly ought not to have been possible after the introduction of the Metonic cycle, if that had controlled the festival calendar. Also perhaps significant is the fact that among the references to the Athenian calendar and the Metonic cycle, which taken together are not so scanty, there is no hint that the Metonic cycle had anything to do with the Athenian calendar. This point, although an argument *ex silentio*, should not go unnoticed, particularly since it fits the rest of the evidence.

In general Van der Waerden's conclusions have been accepted, and to the best of my knowledge no modern student has any longer relied upon Metonic or Callippic cycles to restore single dates in the archon's calendar. Recently Meritt, *TAPA* 95, pp. 236ff., has tried to demonstrate that the kata theon calendar meant "Metonic Calendar," and has set forth years which he determined as intercalary by Metonic, epigraphic, and numismatic[1] evidence. However, even this cannot be set out to show a consistent pattern, as for example, Meritt's fourteenth Metonic cycle,[2] beginning in 185 B.C., shows the following discrepancies:

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[1] *Op.cit.*, *JHS* 80, 1960, pp. 177–179.

[2] That intercalary days cannot explain calendaric error, as the 5% of the decreees passed on intercalary days requires too great an error, in the period 346–100 B.C.; that the differences of 1–20 days between *kata theon* and *kat' archonta* dates in the 2nd century shows that the archon's calendar was irregular, assuming that *kata theon* means "according to the moon"; that there was as great irregularity in the third century as the second; that Aristotle's statement of regular prytanies (see p. 61) requires irregular festival months; Aristophanes, *Clouds* 615–616, accusing the Athenians of not conducting the days rightly, but mixing them up and down so that the gods go to bed without supper, shows that the festival calendar was irregular in the late fifth century; that there are five examples of differences between the Athenian calendar and other Greek calendars (citing W.K. Pritchett, "Julian Dates and Greek Calendars," *ClPhil.* 42, 1947, p. 235) and that there is no reason to suppose that other calendars were wrong while the Athenian was right. Some of these points, particularly the narrow interpretation of Aristotle, are still in dispute (cf. Meritt, "Athenian Calendar Problems," *TAPA* 95, 1964, pp. 200f.), but to the best of my knowledge no one any longer disputes the view that there was some irregularity in the festival calendar. For a fuller discussion of these points, see my examination of the Athenian Calendar, above, pp. 57–64.

	or[3] O I O I O I
Metonic Intercalation	O I O O I O O I O I O O I O O I O I O
Meritt's Intercalation	O I O I O O I O O O I O I O I I O O I[4]

The preceeding cycle too, beginning with 204/3, shows disagreement:

	or O I O I O I
Metonic Intercalation	O I O O I O O I O I O O I O O I O I O
Meritt's Intercalation	I O O O I O I[5] O I O O I O O O I O O I

Although there is some agreement, even a large amount of agreement, there is also a significant amount of disagreement. The agreement would be easy to explain: an attempt to keep the calendar in accord with the moon *ought* to parallel closely a cyclical system which would do so. The disagreement is harder to explain in terms of a Metonically controlled cycle. If one is using a cycle, one uses it, and we should not expect to find many cases, if any at all, in which the evidence does not fit the cycle if it had been used, and we should not expect to find a cycle like that of the period 185–166 with eight instead of seven intercalary years.

Meritt's hypothesis[6] finds accord in the early years of the cycle, except for transposition of O I to IO in 307/6 and 306/5 in the seventh cycle (explained by an unusually hard winter), and for transposition of I O to O I in 298/7 and 297/6 in the eighth cycle. For the ninth cycle he finds "the festival calendar has more points of agreement than of disagreement with the Metonic system. From this point the difficulties of tampering and irregularity increase." Meritt thus believed that for "upward of a hundred years the Athenian festival calendar had followed the Metonic cycles much more closely than we had been led to believe."

In any case, there has been no demonstration that the Athenian civil, archons', festival calendar was controlled in its day to day and month to month structure by any astronomical cycle. The civil calendars were operated independently of the astronomical calendars, and cycles like the Metonic or Callippic cannot be applied to civil practice to derive julian dates from Greek civil months, in the way that they can be used with confidence and precision in denoting precise days for astronomical practice.[1] It is only after the julian reform, when the Roman calendar was modified to take into account long known astronomical data, that a civil calendar was influenced by the astronomers' calendaric innovations.[2]

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[1] M. Thompson, *The New Style Silver Coinage of Athens*, Numismatic Studies 10, American Numismatic Society, New York 1961.

[2] *Op.cit.*, *TAPA* 95, p. 239.

[3] These are Van der Waerden's alternatives. Meritt, *op.cit.* p. 237, accepts Fotheringham's scheme.

[4] Originally this year, 167/6, was designated as ordinary, but Meritt, having suggested it might be intercalary, *TAPA* 95, 1964, p. 243, note 145, now accepts it as such (*Hesp.* 37, 1968, p. 236) on the basis of the numismatic evidence.

[5] Meritt, *Hesp.* 37, 1968, pp. 235–236, acknowledging that 196/5 must have been intercalary, has revised his designation of the years 198/7 to 195/4.

[6] *Op.cit.*, pp. 237–238.

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[1] Since writing this, I have seen Meritt's discussion of the Metonic cycle in connection with the years 299/8 – 295/4, *Hesp.* 38, 1969, pp. 107–113. A fuller examination of the evidence for claiming that the Metonic cycle was actually used for civil practice, and indeed, that the Metonic cycle was the same as the κατὰ θεόν calendar, appeared in *Arch. Ephem.* 1968, pp. 92–105. What is needed, but not yet afforded by the evidence, is some demonstration that months κατὰ θεόν, or that at least one such month, began before first visibility, while the calendar nevertheless kept close accord with the moon. Such a demonstration would be possible only if the calendar were controlled by a cycle. To my knowledge, however, the evidence does not provide data which would make such a determination possible.

[2] For example, although the 365¼ day year was known and decreed by the Canopus Decree, *OGI* 56, the orders to intercalate a 6th epagomenal day had no effect. And although a 25 year lunar cycle was a control for the Macedonian Calendar in Egypt (q.v.), that cycle had its origin in religious not astronomical usage, and even though the 365¼ day tropical year was known at the time, no effort was made to accommodate that cycle to that phenomenon.

CHAPTER III

GREEK CIVIL CALENDARS

1. Athens

Calendars and Months Used

According to the Pritchett-Neugebauer hypothesis[1] there were three separate calendars in operation at Athens. 1. There was a lunar regulatory calendar controlled by observation of the moon; 2. there was a festival or archon's calendar which used the same month-names as the lunar regulatory calendar, but was subject to radical tampering by the archons and was often seriously out of phase with the moon; 3. the prytany or conciliar calendar which divided the year by the prytanies of the *boule* followed closely the rule elucidated by Aristotle in *Ath. Pol.* 43.2.

Both lunar regulatory and festival calendars used months, and the names and order of the months were the same:

1. Ἑκατομβαιών, 2. Μεταγειτνιών, 3. Βοηδρομιών, 4. Πυανεψιών, 5. Μαιμακτηριών, 6. Ποσειδεών, 7. Γαμηλιών, 8. Ἀνθεστηριών, 9. Ἐλαφηβολιών, 10. Μουνυχιών, 11. Θαργηλιών, 12. Σκιροφοριών.

Any observation controlling the beginning of the month in the lunar regulatory calendar would almost certainly have been that of first visibility of the crescent in the evening.[2] Aratus' generalization[3] ὀλίγη μὲν ὅταν κεράεσσι σελήνη ἑσπερόθεν φαίνηται, ἀεξομένοιο διδάσκει μηνός that the month begins with the appearance of the crescent probably applies to Athens as well as other Greek cities. There is no evidence to suggest any other time for the beginning of the months, and it is reasonable to assume that the dates within the months also began in the evening. There is no evidence that the lunar regulatory calendar served any purpose other than as a standard, that is, control of the lengths of the years in the other calendars. Although dates on the lunar calendar, termed κατὰ θεόν in Greek, appear in some inscriptions in equations with dates of the other calendars,[1] there is no indication that any public religious or secular occasions were determined by or set for dates in the lunar regulatory calendar.

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[1] For discussion of this hypothesis, see W. Kendrick Pritchett, *Ancient Athenian Calendars on Stone*, Univ. of California Publications in Classical Archaeology 4, no. 4, pp. 267–402, Berkeley, Cal. 1963; B.D. Meritt, *The Athenian Year*, Univ. of Calif. Press, Berkeley Calif. 1961; O. Neugebauer and W.K. Pritchett, *The Calendars of Athens*, Cambridge, Mass. 1947; B.D. Meritt, *The Athenian Calendar in the Fifth Century*, Harvard University Press, Cambridge, Mass. 1928, and articles cited in these various studies.

[2] Cf. the discussion by Nilsson in *RE*, s.v. *Noumeneia*. It should be noted that in theory, at least, this calendar was to have followed the moon, and could have been controlled either by observation or by a regulatory cycle.

[3] *Phaenomena* ll. 733–735.

The archon's calendar also is termed the festival calendar because religious festivals in Athens were set for dates in that calendar. Such dates are often identified in Athenian inscriptions by the phrase κατ' ἄρχοντα. The archons were free to add days to the calendar: there is an instance of an Elaphebolion 9 which must have been repeated on successive days, first designated as Elaphebolion 9 embolimos, and then as second third and fourth embolimos.[2] The testimony of Aristophanes *Clouds* 615 ff., to the effect that the Athenians do not keep days properly but jumble them up and down so that the gods are disappointed of their meals, and at other times are offered feasts when they themselves are keeping fasts, illustrates that the festival calendar was seriously out of accord with the moon, *and that the Athenians were aware of that fact.* The radical irregularity in a calendar of this sort makes it impossible for us to find julian equivalents for dates in that calendar.[3]

Intercalation of Months

Inasmuch as the regulatory calendar at Athens was lunar, intercalation of months was necessary to keep it (and also the festival calendar) in accord with the seasons. As the base calendar, the lunar regulatory calendar, took from time to time an extra month by intercalation, that intercalation correspondingly was introduced into and prolonged the duration of the festival year insofar as the festival calendar was in accord with the lunar calendar in that year. Intercalation was usually accomplished by repeating one whole month, usually the month Poseideon, before continuing on to the next month in the regular sequence of months. Earlier studies of Athenian practice with regard to the determination or intercalary and ordinary years attempted to wrestle with the problem in terms of a Metonic cycle (q.v.) with predetermined intercalary and ordinary years. Modern practice has abandoned the Metonic cycle as a workable aid to the identification of intercalary and ordinary years,[4] and epigraphists have attempted to determine these years from inscriptions using the archon's name as guide to the julian year, and deducing from the relationships between dates in calendar equations the nature of that year.[5] A recent study of Athenian coinage has approached the problem from a different direction.[1] There are so-called amphora letters on all Athenian tetradrachms from 185/4 through 88/7 B.C. There are thirteen letters which run from *alpha* through *nu*, and each of these corresponds to one month in the festival calendar; clearly, where the *nu* appears there was a thirteenth month, and thus an intercalary year. The assignment of any series, with or without evidence for intercalation, to any julian year, depends on the full analysis of die links and other factors internal to the series affecting the dating of coins, and is thus numismatic and independent of epigraphic testimony. M. Thompson's investigations find *nu* in 184/3, 171/0, 170/69, 167/6, 162/1, 154/3, 137/6, 134/3, 125/4, with certainty as to the accuracy of the dates,[2] and in 119/8 and 113/2. Thompson's view is that the absence of letters at the end of the year (*lambda* and *mu* also often omitted) indicates curtailed production and this means that we cannot take the absence of *nu* to demonstrate an ordinary year.[3] However, we can take a *nu* as a certain indicator of an intercalary year, and we thus have identification of intercalary years entirely apart from archon lists or interpretation of the significance of calendar equations. More important for calendar studies, the appearance of two consecutive intercalary years (171/0 and 170/69) shows that the Athenians did not always follow a scheme which separated intercalary years. Considerable irregularity of intercalation is indicated, and this taken together with the erratic nature of the progress of individual years complicates even further any attempt to use the dates of the festival year to establish julian dates.

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[1] E.g., in the second century B.C., *IG* II² 861 and others cited by Pritchett and Neugebauer, *op.cit.* p. 15. Meritt now argues in *TAPA* 95, 1964, pp. 200–260, that the κατὰ θεόν calendar was in fact the Metonic cycle. Cf. p. 55, note 1.

[2] *Hesp.* 23, 1954, p. 299.

[3] Pritchett and Neugebauer, *op.cit.* pp. 14–22, argue that single dates must be κατ' ἄρχοντα. Pritchett holds to the position and adduces further evidence in *Calendars* 1963. If right, this view vitiates any attempt to derive precise julian dates from single dates in Attic inscriptions.

[4] Cf. Meritt (1961); Pritchett (1963), and above, astronomical calendars, pp. 52–55. Meritt has recently returned to a hypothesis involving the Metonic cycle.

[5] *V. sub.* Archon, pp. 195 ff. With regard to

The Counting of Days of the Month

The days of the month were counted off in three groups, the first expressed in terms of the 'rising' month, the second with combinations of numeral plus ten, and the third, in its earlier form expressed in terms of the 'dying' month, later, in terms of days after the twentieth. In the earlier form of counting, the days seemed to be counted off in the following manner:[4]

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the attribution of individual archons to specific julian years, disagreement over the placement of some of the archons prevents a consensus for the list as a whole, and different interpretations of placement of certain archons or of the interpretation of certain calendar equations has also precluded agreement on all identifications of intercalary and ordinary years.

[1] M. Thompson, *The New Style Silver Coinage of Athens*, Numismatic Studies 10, American Numismatic Society, New York, 1961.

[2] *ibid.*, pp. 612–613.

[3] *ibid.*, p. 612. It is possible that curtailment of production is not the sole explanation of absence of *nu*, or even, in some cases, of *mu*. As the archons were free to add dates to the festival calendar, that calendar fell behind the lunar calendar, in some years by as much as a month. (cf. Pritchett (1963) p. 337) The absence of amphora letters at the end of a year may indicate official practice with regard to the dragging festival year. Towards the end of the year, all but festivals may have been excised from the year, to make it end with the lunar year. This would in some cases have eliminated the better part of a month, and in such cases the assignment of an amphora letter to the fragmentary remainder of the year might have been abandoned.

[4] Meritt and Pritchett once agreed on this presentation; cf. their (identical) lists and comments on individual appellations of days in Neugebauer-Pritchett, p. 30f.; Meritt (1961) p. 45f.

1 νουμηνία
2 δευτέρα ἱσταμένου
3 τρίτη ἱσταμένου
4 τετρὰς ἱσταμένου
5 πέμπτη ἱσταμένου
6 ἕκτη ἱσταμένου
7 ἑβδόμη ἱσταμένου
8 ὀγδόη ἱσταμένου
9 ἐνάτη ἱσταμένου
10 δεκάτη ἱσταμένου

11 ἑνδεκάτη
12 δωδεκάτη
13 τρίτη ἐπὶ δέκα
14 τετρὰς ἐπὶ δέκα
15 πέμπτη ἐπὶ δέκα
16 ἕκτη ἐπὶ δέκα
17 ἑβδόμη ἐπὶ δέκα
18 ὀγδόη ἐπὶ δέκα
19 ἐνάτη ἐπὶ δέκα
20 εἰκοστή, δεκάτη προτέρα

21 δεκάτη φθίνοντος, δεκάτη ὑστέρα
22 ἐνάτη φθίνοντος
23 ὀγδόη φθίνοντος
24 ἑβδόμη φθίνοντος
25 ἕκτη φθίνοντος
26 πέμπτη φθίνοντος
27 τετρὰς φθίνοντος
28 τρίτη φθίνοντος
29-month full δευτέρα φθίνοντος
29-month hollow ἕνη καὶ νέα
30 ἕνη καὶ νέα

In this system, the count in the last decad was backwards, i.e., counting from high to low towards the end of the month, and in this scheme when a day was to be left out of the month to make a hollow (29 day) month, it was the δευτέρα φθίνοντος (29) which was simply omitted, and that day became ἕνη καὶ νέα, as if to count 28, 30. Proclus describes this method of omission of the day before the thirtieth as that used by the Athenians.[1]

The terminology for the days of the last decad changed towards the end of the fourth century B.C.; the expression *x* day φθίνοντος was replaced by *x* day μετ' εἰκάδας. The nature of this count is much mooted, at least in regard to the consistency of count. That it was backward count at least sometimes has been demonstrated by Meritt,[2] and his view now is, essentially, that each appearance of the phrase μετ' εἰκάδας must be tested for forward and backward count, as either is possible.[3] Pritchett insists upon uniformity of type of count, and argues that with backward count proved, forward count must be discarded.[4] Neither position has been proved right; however, the weighty argument in favor of uniform count, ie., without uniformity, a date in the last decad would be relatively meaningless,[5] has never been answered, and there may be some movement towards a consensus with Dinsmoor's proposal of a transitional period ending in 307, after which the count was uniformly backward.[6] It would not be inconsistent with the Pritchett position to believe that the introduction of the new term was not a formal alteration of count, and was not to change the method of counting, and that there never was a formal alternative to backward count, but that some confusion was engendered by new terminology. For chronological purposes, backward count may be assumed after 307. Forward count in isolated cases may be agued prior to that, but it is important to note that no instance of forward count with the term μετ' εἰκάδας is accepted as proved by all students of the Athenian calendar. The terminology for the individual days of the last decad, expressed μετ' εἰκάδας follow, in backward and forward count:

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[1] Scholia to Hesiod, *Op.* 765–768, mooted by Meritt (1961) Chap. III, particularly p. 47f. Pritchett's answer appears in *BCH* 85, 1961, p. 24f., summarized in Pritchett (1963), p. 324f. For the citation of *IG* II², 339 to refute Proclus, Meritt (1961) p. 48–50, see the (not cited by Meritt) Neugebauer-Pritchett restoration p. 46, in accord with the Proclus position, and the comments in Pritchett (1963) p. 276–277. The issue of the omitted day remains contested; cf. now Meritt, *Arch. Ephem.* 1968, pp. 77ff.

[2] *Hesp.* 4, 1935, p. 525f.

[3] Meritt (1961) p. 51f., especially p. 52, top of page.

[4] Pritchett (1963) p. 349f.

[5] *ibid.*, p. 354, citing G. Daux, *REG* 63, 1950, p. 254.

[6] In a review of Neugebauer-Pritchett, *American Historical Review* LIV, No. 2, January 1949, p. 337.

	Backward count		Forward count
	δεκάτη προτέρα		δεκάτη προτέρα
21	δεκάτη ὑστέρα	21	δεκάτη ὑστέρα
22	ἐνάτη μετ' εἰκάδας	22	δευτέρα μετ' εἰκάδας
23	ὀγδόη μετ' εἰκάδας	23	τρίτη μετ' εἰκάδας
24	ἑβδόμη μετ' εἰκάδας	24	τετρὰς μετ' εἰκάδας
25	ἕκτη μετ' εἰκάδας	25	πέμπτη μετ' εἰκάδας
26	πέμπτη μετ' εἰκάδας	26	ἕκτη μετ' εἰκάδας
27	τετρὰς μετ' εἰκάδας	27	ἑβδόμη μετ' εἰκάδας
28	τρίτη μετ' εἰκάδας	28	ὀγδόη μετ' εἰκάδας
29	month full δευτέρα μετ' εἰκάδας	29	month full ἐνάτη μετ' εἰκάδας
29	month hollow ἕνη καὶ νέα	29	month hollow ἕνη καὶ νέα
30	ἕνη καὶ νέα	30	ἕνη καὶ νέα

The Prytany Calendar

This calendar was based on the terms of each of the Athenian tribes serving as prytaneis, or committees, of the boule, and for this reason it is also termed by some the *conciliar* calendar. Aristotle, writing at the time of the division of the Athenians into ten tribes, states that under the constitution in effect (the 4th century constitution) the division of the year into prytanies operated with regular prytany lengths, and that the prytany year and lunar year were coterminous:[1]

πρυτανεύει δ'ἐν μέρει τῶν φυλῶν ἑκάστη καθ'ὅ τι ἂν λάχωσιν, αἱ μὲν πρῶται τέτταρες ἓξ καὶ λ̄ ἡμέρας ἑκάστη, αἱ δὲ ς̄ ὕστεραι ε̄ καὶ λ̄ ἡμέρας ἑκάστη. κατὰ σελήνην γὰρ ἄγουσιν τὸν ἐνιαυτόν.

This requires a sequence of 36, 36, 36, 36, 35, 35, 35, 35, 35, 35, in an ordinary year of 354 ± 1 days.[2] Aristotle makes no mention of the division in intercalary years, but these, 384 ± 1 days in length, imply a division of 39, 39, 39, 39, 38, 38, 38, 38, 38, 38, if the same pattern was followed. This clear statement by Aristotle has never been successfully refuted,[3] and it may be taken, *pro tem.* at least, as an accurate portrayal of the operation of the prytany calendar in the fourth century. In the period after Aristotle there may have also been a similar rule of regularity by which the prytany calendar would have been modified by the addition of tribes, but there is neither a statement as explicit as Aristotle's for the fourth century, nor the quantity of evidence which exists for earlier times by which the calendar can be tested.[1]

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[1] *Ath. Pol.* 43.2.

[2] By the nature of the motion of the moon, a lunar year can be 353, 354, or 355 days in length. If the prytany year was to be coterminous with the lunar, the adjustment could be easily made in the last prytany, determinable by observation of last visibility (cf. Pritchett, *ClPhil.* 54, 1959, p. 151f., and Pritchett presents the hypothesis (Neugebauer-Pritchett p. 36; Pritchett, 1963, p. 356) that the last prytany was adjusted ± 1 day when necessary.

[3] Necessary would be, at least, contradiction by another contemporary witness, or better, an instance of a prytany date in an inscription which is higher than that allowed by the rule. Neither exists. The evidence adduced to refute Aristotle (Meritt 1961, p. 72f.) is based on rejection of the application of the rule to certain years through interpretation of the festival calendar in those years. But, without the establishment of the nature of the festival calendar by some evidence independent of calendar equations, the reasoning, and the application of the festival year to demonstrate the nature of the prytany calendar, is circular. As to the absence of the higher dates which would disprove Aristotle's rule, an argument *ex silentio* may be a weak one to prove something, a *silentium* confirming an ancient witness is impressive; in any case, as has been pointed

For the fifth century, the question of the nature of the prytany calendar and the possible application to it of a rule similar to that proposed by Aristotle has been much mooted. The rule which has been offered[2] assigns 366 days to the prytany year, distributed 37, 37, 37, 37, 37, 37, 36, 36, 36, 36, similar to the Aristotelian pattern in that the prytanies of higher number come first. That such was the pattern has not been proved, although the evidence of unrestored portions of inscriptions is consistent with it.[3] It is extremely important to note, however, that with all the discussion, the treatment of the inscription central to the problem, *IG* I^2 324, has produced agreements more important than the disagreements. With regard to the years covered by that record of loans and interest due the treasury of Athena and the Other Gods, i.e., 426/5 to 423/2, modern studies indicate a length of 366 days for the prytany year. There has been no proposal of prytany length less than 36 days or more than 37 days, at least for that period. A recent study[4] attempting to control restorations by demonstrating the nature of computation on the abacus, and by so doing narrowing the possible restorations and thus perhaps making those restorations more certain, has proposed a solution for the four years with which the inscription

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out (Pritchett 1963, p. 357f.) that fact that the steadily increasing number of texts have not brought a single instance of a higher date decreases the probability that there were such.

[1] In the periods of twelve tribes, 307/6–223 B.C., and 201/0 B.C.–124/5 A.D., Neugebauer-Pritchett, p. 68f., argue that a regular sequence of 32 days (± 1 at the end) for each prytany in intercalary years is consistent with the evidence. For ordinary years, they were not able to propose a pattern; the prytanies ought to have been 29/30 days if the prytany calendar of 12 prytanies was co-terminous with the lunar year of 12 months. The evidence of Pollux (VIII, 115, ἐκάστη φύλη μηνὸς πρυτανείαν ἔχει, if it was intended to mean that each tribe had a prytany of a (precise) month, rather than of a (period, 29–30 days, of a) month, is refuted by the deviation of one day between prytany and kata theon dates in the 2nd century. (cf. Neugebauer-Pritchett, p. 78f., and Meritt [1961] p. 135f.) For the period of 13 tribes the evidence is extremely sparse. Neugebauer-Pritchett, p. 89f., point out that in intercalary years the 13 prytanies would be more or less parallel to the 13 lunar months, and propose for ordinary years the Aristotelian pattern, 28,28,28,28,27,27,27,27,27,27 ± 1. No date exceeds this, but little evidence exists.

Meritt (1961), Chapters VI and VII, opposes the proposal for the regular prytanies in these periods. His argument is essentially that used in the discussion of the 4th century, but here, the proposal for regular prytanies is no less circular than his. No position can be regarded as attested by independent evidence, much less 'proved'.

[2] Neugebauer-Pritchett, p. 94f.

[3] Some of the evidence in its favor is impressive: in addition to *IG* I^2, 324, *IG* I^2, 374 indicated a 37 day prytany as number six prytany of the year 408/7, while the eighth prytany had 36 days; far more important, an argument in favor of known lengths for prytanies is the fact that the terminology for giving dates in the prytanies, ie. "*x* days were left in the prytany" implies determined lenghts. Pritchett (1963) p. 312 considered that this terminology proved predetermined lengths for prytanies.

[4] M. Lang, "The Abacus and the Calendar," *Hesp.* 23, 1964, p. 146f.

is concerned: each prytany year is 366 days long, three of the years follow the $37 \times 6 + 36 \times 4$ scheme, and even in the exceptional year, the third, there were six 37 day prytanies and four 36 day prytanies, with the four of 36 day length falling in a group in prytanies III–VI.[1]

The conclusions which have been drawn from *IG* I^2 324 have in the past been made the basis of the analysis of the prytany calendar of the fifth century. In the absence of evidence to disprove the conclusions which may be drawn from that inscription[2] we may say that the present state of the enquiry shows a prytany calendar of 366 days, composed of six prytanies of 37 days and four of 36 days. The tendency of the discussion is toward acceptance of a high degree of regularity in the order of these prytanies, with the longer ones at the beginning of the year, and with some sort of grouping of the prytanies of the different lengths.

The Count of Days in Prytanies

Within each prytany, the days were numbered in succession from the beginning of the period to the end, using ordinal numerals, in the following pattern: τετάρτηι καὶ τριακοστῆι τῆς πρυτανείας: on the thirty-fourth of the prytany. In earlier (fifth century) inscriptions, cardinal, then ordinal, numerals were used in the formula ἐσεληλυθυίας x ἡμέραι τῆς πρυτανείας; there is an instance of indication of date by notation of the days remaining in a prytany, and reference to the last day as τελευταία.[3] There are, however, no intances attested of manipulation of the prytany calendar by the insertion of embolimos days such as are well known in the archon's calendar. A date in terms of the day of the prytany can be reliably counted from the first day of the prytany save in the few instances when it is expressed in terms of the remaining days, in which cases the number of days in the specific prytany involved must be determined.

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[1] Although Meritt (1961) p. 202 f., had insisted that at least two of the years had had 365 days, and regarded the prytany year as a 'seasonal year', he has now (*TAPA* 95, 1964, p. 200, accepted Lang's conclusions that the years 426/5–423/2, at least, each had had 366 days, thus moving closer to the acceptance of a 366 day rule. Pritchett, however, has attacked the whole Lang scheme (*Hesp.* 34, 1965, pp. 131–147) on the grounds that, *inter alia*, that the abacus has not been successfully demonstrated to have been an abacus, that errors of computation are still required, and that we may still not restore inscriptions and from the restorations argue the calendar. Lang has responded, (*Hesp.* 34, 1965, pp. 224–247) explaining her position further. The issues cannot be settled by restorations, however plausible, and the mooted details probably must await new evidence for solution. For a recent presentation of the Lang-Meritt text of the stone, see now *ClQuart.* 18, 1968, pp. 84–94.

[2] That is, taking only unrestored text as valid for conclusions about the calendar.

[3] Pritchett (1963) p. 357, and *BCH* 81, 1957, p. 292.

The Beginning of the Year

The determination of the beginning of the lunar regulatory year is a most important factor in any attempt to determine julian dates from Athenian calendar dates. Save for the prytany calendar before the fourth century, the duration of the year in any of the calendars was established by the duration of the lunar year. That lunar year began on the evening of first visibility following the summer solstice;[1] at that time, Hekatombaion 1 of the lunar calendar began, and with it, Hekatombaion 1 of the archon calendar. From the fourth century on, the first day of the first prytany began at that time also. However, even with the beginning of the lunar year known, a number of factors impede the ready conversion of Athenian month dates into julian dates. In the first place, the radical manipulation of the archon's calendar precludes the use of dates in that calendar to determine precise julian dates. Only a vague approximation is possible. The only dates for which precise equivalents could be found are those in the lunar calendar, identified by the term κατὰ θεόν, but these exist only in the second century B.C. Even in this period, intercalation must be known, else there will be some equations which will be off from the true relation by one month.

The prytany calendar is of some assistance from the fourth century on, as it began with Hekatombaion 1, i.e., first visibility after the summer solstice, and was itself regular. However, here too the determination of intercalation is important, as the lengths of the prytanies vary between ordinary and intercalary years. The application of the prytany calendar to the fifth century is even more difficult, as less is known about it and it was not co-terminous with the lunar year, so that the starting point cannot be determined for every year.

2. Evidence for the Mycenaean Calendar

Recent evidence shows that the year was divided into named months as early as Mycenaean times. Two months of the calendar are attested at Pylos. There is a pa-ki-ja-ni-jo-jo- me-no (μην(ν)ός) clearly identified as a month, and the name may be local or theophoric.[1] There is also a po-ro-wi-to-jo which heads a list of ritual activities; this is often suggested to be a month, and has been interpreted as the 'sailing', or 'navigation' month, *Plowistos*.[2] The same month names do not as yet recur at Knossos. The tablets there produce the names a-ma-ko-to, de-u-ki-jo-jo, di-wi-jo-jo, ka-ra-e-ri-jo (or -jo-jo), ra-pa-to, wo-de-wi-jo (or -jo-jo) all followed by the qualifying me-no.[3] Of these, di-wi-jo-jo is theophoric, of the type of the later Δῖος (q.v.). Ra-pa-to (Lapatos) is attested in a third century B.C. proxeny decree from Orchomenos in Arcadia, in the form Λαπάτω.[4]

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[1] Aristotle, *Hist. Anim.* 543 b, reporting that the tunny-fish bears in Hekatombaion, states that this month falls at the time of the summer solstice: θέρους δὲ περὶ τὸν ῾Εκατομβαιῶνα θυννίς, περὶ τροπὰς θερινάς. In the same passage he notes that most fish bear in the three months of Mounuchion, Thargelion, and Skirophorion. Pliny, *Nat. Hist.* IX 74, makes the same statement, using the months of April, May and June. Thus the Aristotle statement shows that in the fourth century B.C., the month of Hekatombaion came at the time of the solstice, and that the last month of the year, Skirophorion, came in June, thus beginning just before the solstice. Plato's assignment to the beginning of the year after the solstice, in *Laws* VI, 767c: ἐπειδὰν μέλλῃ νέος ἐνιαυτὸς μετὰ θερινὰς τροπὰς τῷ ἐπιόντι μηνὶ γίγνεσθαι, both makes Aristotle's statement more precise and shows that it applied to the fifth century also. There is confirmation in Theophrastus, *De Caus. Plant.* III, 4, where, in setting forth divisions of the year, the first is that which begins with the summer solstice.

The evidence afforded by the texts is not nearly full enough to permit any analysis of the calendaric system(s) of the late first millenium B.C. If po-ro-wi-to is indeed a month and refers to a season, we are presented with a month name of a type rare in the Greek world,[5] but well attested in the time reckoning systems of primitive peoples.[6] On the other hand, if the views that we do not have a month name here are correct,[7] not even this much may be said. The implication that different month names were used at different places[8] has greater probability. That this was the structure of calendars in later times may have relevance; more telling is the fact that we have at least six[9] month names from Knossos and one or two from Pylos with no overlap. With this number of names the chances are greater for rather than against overlap, were the month-names of the two places identical, and we could assume that at least some of the names were different at the two centers. There is at present no evidence to place the months in order or, apart from the possible po-ro-wi-to, which would come in spring or summer in all likelihood, any way to set any month in relation to the seasonal year. The word me-no might be a clue, indicating at least that the months were lunar.[10]

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[1] Palmer, in *The Interpretation of Mycenaean Greek Texts*, Oxford 1963, p. 248, takes it as 'evidently theophoric'; E.L. Bennett Jr., *The Olive Oil Tablets of Pylos*, Suppl. to *Minos* 2, Salamanca 1958, p. 28, more cautiously refers the month name to a place name, and draws parallels to later month names drawn from places; he considers that a divinity may have drawn a name from the place Pa-ki-ja-na, so often attested at Pylos.

[2] Cf. Palmer, *ibid.* more fully in *Eranos* 53, 1953, pp. 1f.; Bennett, *op.cit.* p. 31f. points out that the absence of the qualifying me-no may mean that this name should not be taken as an indicator of time, and not as a month name.

[3] The initial discussion of these months appears in M. Ventris and J. Chadwick, *Documents in Mycenaean Greek*, Cambridge 1956, p. 305 (p. 286 for Pylos months). Cf. also Palmer, *op.cit.* A. Morpurgo, *Mycenaeae Graecitatis Lexicon*, Rome 1963, gives citations for all the appearances of the names under the entry 'me-no' and under the entries for the respective months.

[4] E. Schwyzer, *Dialectorum Graecarum Exempla Epigraphica Potiora*, Leipzig 1923, no. 667.

[5] But attested; cf. Palmer, *Eranos* 53: Φυλλικός, 'Αμών, Δινών, Πόκιος.

[6] M.P. Nilsson, *Primitive Time-Reckoning*, Acta Soc. Hum. Litt. Lund I, C.W.K. Gleerup, Lund 1920, Chap. VI.

[7] A. Furumark, *Eranos* 52, 1954, p. 51f.; C. Gallavotti, *Parola del Passato* 14, 1959, p. 96f.; G. Pugliese-Caratelli, *ibid.* p. 412f.; M. Doria, *ibid.* 15, 1960, p. 193f.

[8] Bennett, *op.cit.* p. 28.

[9] Or seven; Palmer, *Mycenaean Greek Texts* p. 234 suggests also e-me-si-jo-jo in Knossos tablets E 551 and the broken text E 843.

[10] So Bickerman, *Chronology* 1968, p. 27, pointing out how little we can conclude from the amount of evidence available.

3. Boeotia

Hesiod

The earliest evidence for months in Boeotia comes from Hesiod, and that evidence has been variously interpreted. Only one month name appears in the text: Ληναιῶν, *Erga* 504. This month does not appear among the month names attested in Boiotia in later times,[1] and its presence in Hesiod's text suggests a change between archaic and classical times. No more than this single month is known for the nomenclature of the archaic calendar. For the internal organization of the month, the 'fasti' of the *Hemerai*, lines 765 – end, have provided evidence.

There seems no reason to doubt that the system of dividing the months into thirds, well attested elsewhere in Greece, is demonstrated by the appearance of such expressions as, e.g. Ἕκτη δ' ἡ μέσση, l. 782, against ἡ πρώτη ἕκτη in l. 785. But the text of the days displays a variety of methods of counting the days of the month. A variety indeed might be expected from the nature of the poem,[2] and at least three systems of numeration of dates can be clearly identified.[3] There is one system of presenting the days as simple ordinal numerals, e.g. τετάρτη (l. 800), πέμπτη (803), ὀγδοάτη τ' ἐνάτη (772), δυωδεκάτη (774), εἰκάς (792), and τριακάς (l. 766). A second method of enumeration uses the common Greek terms ἱσταμένου, φθίνοντος (ll. 780, 798), and Gjerstad believed that this demonstrated a counting in which the months were divided in half.[4] This may well be the case; it would be a convenient explanation of the ἱσταμένου τρισκαιδεκάτην in l. 780. A third method of numeration uses the terms πρώτη, μέσση, and must indicate a division of the month into decads, although unfortunately a clear designation of a day in the third decad by this system is lacking.

In addition to these systems, the terms τρισεινάδα in l. 814 and μετ' εἰκάδα in l. 820 fit none of the three. We simply do not know the meaning of τρισεινάδα, and τετράδι. . . . μετ' εἰκάδα cannot be given a numerical equivalent without a convincing demonstration of the nature of the end of the month – whether it was counted forward or backward.[5]

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[1] See below, p. 67. Proclus, Schol. ad Hes. *Erga* 504, suggests that either the Boeotian Boulatios or Hermaios is meant.

[2] F. Solmsen, *TAPA* 94, 1963, pp. 293–320, has demonstrated that the text itself is the work of a number of poets, with strains of different ideas and superstition identifiable in different lines.

[3] In *TAPA* 97, 1966, pp. 421–429, I accept Solmsen's thesis about the nature of the poem, and find in that the explanation of the different kinds of numeration of days.

[4] E. Gjerstad, "Lunar Months of Hesiod and Homer," *Opuscula Atheniensia* I, 1953, pp. 187ff.

[5] *Loc.cit.* Gjerstad's discussion, which argues from an assumption that the text is a unity, offers demonstrations of the numerical values of these dates by aligning the different systems one with the others. But if the text is not a unity, the argument cannot stand, nor can the final conclusion that the Hesiodic month was synodic. There is no solid evidence available to date to bear on this last question.

Although Hesiod mentions only one month by name, the description of that month, Lenaion, as an unpleasant wintry month to be avoided, in *Erga* 504ff., makes it clear that some regulation of the year existed in order to bring the months to their correct places in the seasons. While we have no way to know which month was intercalated, if any, or of what sort and how effective the intercalation was, it is useful to have attested so early the common Greek practice of organizing the lunar year to fit the seasonal year.

Our conclusions about the archaic Boeotian calendar must be very limited. The days of the month were numbered, one way or the other;[1] month names were known and used; some form of adjustment was known to make the lunar year accord with the seasons. A calendar, workable enough to be used as a reference, at least for days of the month, was in existence in archaic times, and in some terminology and in the decadal system of the month at least bore affinities to a number of better known Greek calendaric systems.

Names and Order of the Months

1. Βουκάτιος: Plutarch, *Pelop.* 24 speaks of the year ending at the time of the winter solstice in 370 B.C. Proclus, *Schol. ad Hes. Erga* 504, (ed. Pertusi, p. 171) suggests that the Lenaion in Hesiod, not attested in the Boeotian calendar, might mean this month or the next, Hermaios. *GDI* 1872, 177/6 B.C., equates Boukatios with Poitropios (q.v.); Boukatios begins a list of interest periods, by months, all in one year in *SEG* XIX, 335.63. See below, nos. 5–7.

2. Ἑρμαῖος: Proclus, *Schol. ad Hes.* 504, states that this month comes after Boukation; also states that it fell at the same time as (the Attic) Gamelion (q.v.). What is meant is the position of the month in the calendar, and the time in the year. Generally, Gamelion was a winter month, as Hermaios is said to be.

3. Προστατήριος: Plutarch, *Symp.* 7,1 (*Mor.* 655), equates this to the Attic Anthesterion.

4. Ἀγριώνιος: *Arch. Deltion* 21, 1966, pp. 45–49.

5. Θιούιος: *IG* VII 3172.166

6. Ὁμολώιος: *IG* VII 3172.169

7. Θειλούθιος: *IG* VII 3172.176. The months appear in order, without interposition of other months, in this record of extracts relevant to the loan by Nikarete to Orchomenos. Foucart, in his first publication of the inscription, argued (*BCH* 4, 1880, p. 20) on the basis of *IG* VII 517, dated μεινὸς Θουίω νευμεινίη, κατὰ δὲ τὸν θεὸν Ὁμολωίω ἐσκηδεκάτη, that Thiouios preceded Homoloios; his citation of the Thessalian calendar (*ibid.* n. (1).) in which Thiouios immediately precedes Homoloios, is a less valid argument. The position of Theilouthios is taken from its position in the

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[1] Samuel, *Op.cit.* p. 428, suggests that the different systems in Hesiod may attest diverse contemporaneous systems, or, alternatively, some or all of the systems may have nothing whatever to do with calendar reckoning.

inscription, immediately following the other two months. For confirmation of the order, cf. *SEG* XIX, 335, 85 B.C. Interest is given for three periods within one year: Boukatios to Thiouios (l. 64), Homoloios alone (l. 66) and then Theilouthios to Alalkomenios. (l. 68).

8. Ἱπποδρόμιος: Plutarch, *Cam.* 19, states that the Athenians call this Hekatombaion.

9. Πάναμος: *Ibid.*, gives an equation to the Attic Metageitnion. Both this and the preceding express the equation (καλοῦσι) as a generality; true either for Plutarch's time or in a set order such as that which was known, e.g., by Proclus. This is different from a true "double date" such as Plutarch, *Arist.* 19, 4 Boedromion = 27 Panemos, for the battle of Plataea. From that date, if correct, we can conclude that in 479 B.C. the correlation between Boeotian and Attic calendars was different from the (later?) version available to Plutarch and Proclus; but the shift is only a month, easily explicable in terms of two shifting lunar calendars.[1]

10. Παμβοιώτιος: Placed by B. Latischew, "Die Festzeit der Pamboiotien," *Ath. Mitt.* VII, 1882, pp. 31–39, based on the chronology of the events connected with the loan by Nikarete to Orchomenos, *IG* VII 3172. That it followed Panamos is confirmed by *SEG* III, 367, dated 1 Pamboiotios, in which the agonothetes is said to have died in the (preceding) Panamos.

11. Δαμάτριος: Plutarch, *Isis and Osiris* 69 (*Mor.* 378 E), gives the Attic Pyanepsion as counterpart.

12. Ἀλαλκομένιος: Plutarch, *Arist.* 21, = Attic Maimakterion. As the last month, cf. *SEG* XIX, 335.68, and nos. 5–7, above.

Ἀλαλκομένιος δεύτερος *IG* VII 3172.95, μεινὸς Ἀλαλκομενίω δευτέρω shows this to be the intercalary month, at least at the end of the third century B.C., the date of the inscription.

The names and order of the months are thus attested as early as 479 B.C. and are reported consistently through third century B.C. inscriptions and on into Plutarch's time, so that they may be accepted as correct for Boeotia from the fifth century B.C. on. However, the method of determination of lengths of months and the nature and frequency of intercalation remain unknown.

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[1] Depending upon intercalation and the nature of the regulations of the two calendars the Boeotian and Attic months would not always fall together in the same way. We need not assume with A. Boeckh (*Zur Geschichte der Mondcyclen der Hellenen*, Leipzig, 1855, p. 67 [*Jahrb.f. class. Philol.*, Suppl. N.F. Bd. I, Heft 1]) that Plutarch "fälschlich für identisch hielt" the two days given for Plataea. Elsewhere he gives Boedromion 3 for Plataea (*Cam.* 19; *De Glor. Ath.* 7). He must have considered early Boedromion right for the battle. Both the Attic date of Boedromion and Boeotian date of Panemos, which Boeckh (*loc.cit.*), Ideler (I, 365) considered the right one, could have reflected the date of the battle on the resepective calendars. One may note that J.H. Lipsius, "Zum griechischen Kalendarwesen," *Leipz. Stud.* III, 1880, p. 213), and E. Bischoff, "De Fastis Graecorum antiquioribus," *Leipz. Stud.* VII, 1884, p. 343 n.1, follow Boeckh.

The Counting of Days of the Month

Kata Theon Dates

As in the Athenian calendar (q.v.), the Boeotian calendar seems to have had separate civil and lunar progressions. *IG* VII 517, with its date μεινὸς Θουίου νευμεινίη, κατὰ δὲ τὸν θεὸν ʽΟμολωίω ἐσκηδεκάτη shows this to have been true in the second century B.C. At the time of this inscription the civil calendar (1 Thiouios) was lagging behind the lunar calendar (16 Homoloios), a lag often reflected in the Athenian double dates of the same period. A suggestion for a second instance of such double dating, for the third century, that Δαματρίω νιουμεινί[η] πετράτη in *IG* VII 3172.141 actually means Δαματρίω νιουμεινίη, κατὰ δὲ θιὸν πετράτη has been made by A. Schmidt.[1]

The Count of Days

The discussion of the archaic Boeotian calendar (q.v.) shows that the characteristic Greek "tri-decadal" month was established in Boeotia by the time of Hesiod. This persisted into the period of the canonical calendar in historical times, although terminology changed. The evidence, although far scantier than that for the Attic calendar, suggests that the pattern of names for the days of the month was similar, although not identical, to that of the neighboring Athens:

1. νευμεινίη
2. δευτέρα (ἱσταμένου)
3. τρίτη (ἱσταμένου)
4. πετράς (ἱσταμένου)
5. πέμπτη (ἱσταμένου)
6. ἕκτη (ἱσταμένου)
7. ἑβδόμη (ἱσταμένου)
8. ὀγδόη (ἱσταμένου)
9. ἐνάτη (ἱσταμένου)
10. δεκάτη
11. ἐσκηδεκάτη
12. διωδεκάτη
13. τρισκηδεκάτη
14. πετρακηδεκάτη
15. πεντεκηδεκάτη
16. ἑκκηδεκάτη
17. ἑβδομηκηδεκάτη
18. ὀκτοκηδεκάτη
19. ἐνακηδεκάτη
20. ἰκάς
21. δεκάτη ἀπιόντος
22. ἐνάτη ἀπιόντος
23. ὀγδόη ἀπιόντος
24. ἑβδόμη ἀπιόντος
25. ἕκτη ἀπιόντος
26. πέμπτη ἀπιόντος (Ϝικασῆ κη ἕκτη)
27. πετρὰς ἀπιόντος
28. τρίτη ἀπιόντος (ὀγδόη ἐπὶ Ϝικάδι)
29. προτριακάς
30. τριακάς (or 29, hollow month)

For purposes of reference, the forms given here are those of the Boeotian dialect. The table is partly hypothetical, as not all dates are attested. The relevant evidence follows, without notice of variant spellings.

νευμεινίη	*IG* VII 524 *et passim*
δευτέρα	*IG* VII 3059, Lebadea
πετράς	*IG* VII 3307, Chaeronea, II B.C.; νιονμεινίη πετράς *IG* VII 3172, Orchomenos, late III B.C.

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[1] "Der boiotische Doppelkalender," *Jahrb. f. class. Philol.* 5–6, 1885, p. 364–366. Schmidt proposes a reconstruction of the relationship between the two calendars for the period immediately preceding that double date, as he does also for the double date of *IG* VII 517 (*ibid.* pp. 360–363).

ὀγδόη ἱσταμένου	*IG* VII 507, Tanagra, late III B.C.
ἐνάτη	*SEG* I 115, late III B.C.
ἑσκηδεκάτη	*IG* VII 522, Tanagra, mid. III B.C.
διωδεκάτη	*IG* VII 520, Tanagra
τρισκηδεκάτη	*IG* VII 510, Tanagra
πεντεκηδεκάτη	*IG* VII 3303; ιε′ *IG* VII 3366, Chaeronea
ὀκτοκηδεκάτη	
ἐνακηδεκάτη	*IG* VII 3172, Orchomenos, late III B.C.
ἰκάς	*IG* VII 3353, Chaeronea
ἕκτη ἀπιόντος	*IG* VII 518, Tanagra. The terminology is similar to the Attic ἱσταμένου, 'of the month waning,' and the assumption is made here that the count is backwards, as in Athens. There is no evidence to support or refute that assumption. That there was another kind of count, probably forward as the syntax would suggest, is demonstrated by the following entry.
ϝικαστῆ κὴ ἕκτη	*IG* VII 3172, Orchomenos, late III B.C.
πετρὰς ἀπιόντος	*IG* VII 506, Tanagra, late III B.C.; τετρὰς ἀπιόντος *IG* VII 3378, Chaeronea
τρίτη ἀπιόντος	*Arch. Deltion* 21, 1966, pp. 45–49
ὀγδόη ἐπὶ ϝικάδι	*IG* VII 3348
προτριακάς	*IG* VII 531, Tanagra, III B.C.
τριακάς	*IG* VII 3310, *et passim*

4. Phocis

By far the greatest amount of attestation for the calendar in use in Phocis comes from the manumissions at Delphi, which in a number of instances give Phocian equivalents to Delphian months. Phocis itself, which has offered only a small body of material to the corpus of inscriptions in general, has had little to add to the Delphian material.

The Phocian calendar is attested at the earliest at the beginning of the second century B.C.

Names and Order of the Months

Two kinds of month-names are known in Phocis, a calendar of ordinally numbered months, and a calendar or calendars of months with names. It was the numbered calendar, with Phocian months given at Delphi with Delphian equivalents, which made it possible for Kirchhoff to discern the order of the months in the Delphian Calendar.[1]

The numeral calendar is clearly a federal calendar in use in all Phocian cities, and it had spread through Phocis by the time of its first appearances in the second century. There has been some debate about the nature of the calendar attested by the named months. In the early state of the discussion, Latyschew[2] argued that the named months belonged to the calendar of a single city, specifically, Lilaia, while Bischoff[1] took the position that the month names reflect names which stood in the Phocian calendar before the months were referred to by numbers. More recently Daux has also expressed the belief that the named months were from the common calendar: "... il designe les mois soit par un nom, soit plus frequemment par un adjectif ordinal."[2]

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[1] See below, p. 74, note 1.

[2] Cited by Bischoff, *Leipz. Stud.* 1884, pp. 357 and 316, n. 2: "On Some Aeolian and Dorian Calendars," *Epigraphical Investigations*

As the table below shows, named months appear in association with magistrates from Phocian towns located quite variously; the point made by Bischoff, that these names do appear at times with the term ὡς Φωκεῖς ἄγοντι tells very strongly in favor of the belief that the names do belong to a common calendar. It is worth noting that names are not so far attested after the end of the second century B.C., while the numerals continue into the second century of our era.[3]

In the table, attestation for correspondences with Delphi are given where possible; in the case of numbered months, only one citation is presented for each. Citations with asterisks contain only reference to the month, without a correspondence.

Phocis			Delphi		
Πρῶτος			Ἡραῖος	*GDI* 1727	Πράτω in Elatea = Alalkomenios in Boeotia: *IG* VII 3177
Δεύτερος	Ἀμάλιος	Ambryssa *GDI* 2077	Δαιδαφόριος	*GDI* 1770	
Τρίτος			Ποιτρόπιος	*GDI* 1715	
	Ἀμαλίου τοῦ δευτ[έρου] =	*FD* III 3 333	Ποιτρ[οπίου τοῦ δε]υτέρου		
Τέταρτος	Διονύσιος	Antikyra *GDI* 2107	Ἀμάλιος	**IG* IX 1 194	
Πέμπτος			Βύσιος	*FD* III 4 73	
Ἕκτος	Λάφριος	[Ambryssa, *FD* III 6 84] *GDI* 1728, 1877 (Hyampolis)	Θεοξένιος	*GDI* 1718	
Ἕβδομος			Ἐνδυσποιτρόπιος	*GDI* 1793	
Ὄγδοος			Ἡράκλειος	*GDI* 1747	
Ἔνατος	Ἀφάμιος	Ambryssa, *GDI* 2256 Tithronius, *GDI* 1977, 2033	Ἰλαῖος	*GDI* 1712	
Δέκατος			Ἀπελλαῖος	*GDI* 2214	
Ἑνδέκατος	Βοαδρόμιος	Abai *FD* III 2 230	Βουκάτιος	*GDI* 1755	
Δωδέκατος			Βοάθοος	**IG* IX 1 190	

VIII, St. Petersburg, Aug. Deubner. (In Russian.)

[1] *Ibid.*

[2] G. Daux, *Delphes au II^e et au I^er siècle* Paris, 1936, pp. 643–644.

[3] Only two month-names are attested after the appearance of Boadromios at Abai in 138/7 B.C. in *FD* III 2 230, and both of these, at the latest dating to about 100 B.C., have an element of suspicion. One, Laphrios at Am-

The Count of Days

Only two days are attested in the inscriptions, πεντεκαιδεκάτα, *IG* IX 1 109, and τριακάς, *IG* IX 1 120.

5. Eastern Locris

Very little remains of the calendars of Eastern Locris, but there is enough to show that as late as the first century B.C. two neighboring towns had different calendars. We have evidence of three months of Skarpheia, and two of these corresponding to months of Thronion. There is, however, no indication of order of the months.

	Skarpheia		Thronion	
ΦΑΜΙΟΥ or ΦΑΛΙΟΥ	(Ἀ)φάμιος	=	Ἰτώνιος	*FD* III 4 42
	Ἑρμάνιος	=	Ἱππεῖος	*FD* III 4 159
ΦΥΛΑΙΚΟΥ	Φύλλικος	=	Delphian Ἐνδυσποιτρόπιος	*FD* III 2 228

Among these a single date is attested, τεσσαρακαιδεκάτα, in Itonios at Thronion, in *FD* III 4 42.

6. Doris

As in the cases of calendars of a number of other parts of central Greece, evidence for the calendars of the cities of Doris comes from the mentions of months in Dorian towns among the manumissions of Delphi. We know of months from the calendars of only two towns, the neighbors Boion and Erineus. Although the evidence is exiguous, the correspondences with Delphian months at least make it possible to place the Dorian months in proper position on the calendar.

Delphi		Erineus	Boion	
Ἀπελλαῖος				
Βουκάτιος	=	Βουκάτιος		*GDI* 2149
Βοάθοος	=	Ἀρχοστάσιος		*GDI* 2030
Ἡραῖος				
Δαιδοφόριος				

bryssa, 140–100 B.C., *FD* III 6 84 (= *GDI* 2314) has the month restored. The other, Amalios ho deuteros = Poitropios ho deuteros, *FD* III 3 333, ca. 100 B.C., has its equation at variance with Amalios = Daidaphorios, *GDI* 2077, from Ambryssa, 177/6 B.C. From the latter of these it is possible to conclude that after some years the conjunction of the two calendars had shifted by one month, or, perhaps more likely, that by 100 B.C. the names had fallen into such general disuse that the positions of given names was subject to confusion. For the persistence of the numbered months into Christian times, v. *IG* IX 1 188–193.

Delphi		Erineus	Boion	
Ποιτρόπιος	=	ʽΕσπερῖνος		*FD* III 3 5
ʼΑμάλιος				
Βύσιος				
Θεοξένιος	=	Λάφριος		*FD* III 3 37
ʼΕνδυσποιτρόπιος	=		Πόκιος	*FD* III 1 311
ʽΗρακλεῖος				
ʼΙλαῖος				

7. Delphi

Although Delphi is an epigraphical treasure very few inscriptions antedate the fourth century B.C., and little is known of the calendar before that century. Nevertheless evidence is plentiful at least insofar as the months and their order is concerned, so that the names and sequence of the months are well known enough for the calendar of Delphi to be a guide, through synchronisms, to the calendars of other cities, particularly in western Greece. We cannot, however, derive anything like a full picture of the calendar at Delphi, since the lunar calendar was not the exclusive method of dating at all times, and indeed, the evidence suggests some evolution in dating formulae.[1]

Dating Systems

In the extensive temple construction records of the fourth century B.C.[2] a quasi-calendaric reckoning by autumn and spring meetings of the amphictyons (ὀπωρινὰ πυλαία, ἡρινὰ πυλαία) is combined with the names of archons to establish greater precision within a given year. Although months were certainly known and used at this time,[3] the seasonal meeting was used as a dating formula, in some cases numbered,[4] in preference to months throughout the fourth and third centuries, so that it is not until the second century that we commonly find months cited with archons and officials to date documents.[5] That the change is of fashion and not of meetings is shown by the mention of the pulaia, although not as a date, as late as the first century A.D.[6]

In the second century months were used as part of the dating formula, and the shift to months was accompanied by the use of reference to the semester of the boule, πρώτη, δευτέρα, ἑξάμηνος, which was itself often used without mention of months as part of the formula with the archon and other officials. This change to months established the system which was then used on into the Christian era.

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[1] For the chronology of Delphi, see G. Daux, *Chronologie Delphique*, Paris, 1943 (*FD* III Fasicule hors series) and N. Valmin, *FD* III 6 pp. 131–43.

[2] E.g. *FD* III 6 19 (= *GD* 2502).

[3] *Ibid.* See below, p. 74.

[4] As, e.g. *FD* III 5 3, 13th *pulaia* etc., 363 B.C. and on.

[5] This phenomenon is easily seen for the third century in, e.g., the amphictyonic decrees, *GDI* 2514–2536, in which this formula appears in most decrees.

[6] *FD* III 4 47.18.

Names and Order of the Months

Kirchhoff first set forth the order of the Delphian months in 1864,[1] establishing the order by correspondences with the Phocian calendar, which, with numbered months, made the order clear.

πρώτη ἑξάμηνος	δευτέρα ἑξάμηνος
1. ’Απελλαῖος	7. ’Αμάλιος
2. Βουκάτιος	8. Βύσιος
3. Βοαθόος	9. Θεοξένιος
4. ‘Ηραῖος	10. ’Ενδυσποιτρόπιος
5. Δᾳδαφόριος	11. ‘Ηράκλειος
6. Ποιτρόπιος	12. ’Ιλαῖος

The intercalary month was the sixth, designated as Ποιτρόπιος ὁ δεύτερος. The appearance of Ποιτρόπιος ὁ πρῶτος presumably also indicates intercalary years, and its occurence in a number of cases makes it possible to establish the following years as intercalary:[2] 176/5, 168/7, 165/4(?), 163/2(?), 154/3, 143/2, 140/39, 130/29(?) (or 134/3?), with unplaced intercalary years in priesthoods VI, IX, and XI.

The use of months is attested as early as the end of the fifth - beginning of the fourth centuries B.C.,[3] for indicating dates if not as part of dating formulae, and the calendar continued in use well into the Christian period. A number of synchronisms exist with other calendars and the few with the Attic calendar permit the assignment of general equivalences to the two calendars.[4] The calendar continued in use into Christian times, and there are attested equivalences with Roman months.[5]

The Count of Days

As in most calendaric systems in Greece, the Delphian count of days at the earliest discernable stage seems to divide the month into decads, and demonstrably uses the terminology of the 'waxing' month. There are, unfortunately, not enough attestations of single dates to confirm all the days of the month, but there exist enough dates to establish the pattern, and demonstrate that the pattern was much like that of Athens, at least until the first century B.C.

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[1] "Über die Zeit der pythischen Festfeier," *Monatsbericht der K. Akademie der Wissenschaften zu Berlin*, 1864, pp. 129–135.

[2] Based on G. Daux, *Delphes au IIe et au Ier siècle*, Paris, 1936, p. 84, n. 2, with the alterations necessary from *Chronologie Delphique*.

[3] *FD* III 1 481; *GDI* 2561.

[4] Kirchhoff, *op.cit.* p. 134; synchronisms, e.g. *GDI* 2089, Poitropios-Poseideon: *FD* III 2 66, Boathoios (Βαθῷος) = Boedromion.

[5] E.g., *FD* III 6 19, Boathoos = Sebastos.

1. νουμηνία	*GDI* 2085
2. δευτέρα	*FD* III 5 50, II.6
3. τρίτη	
4. τετάρτη	
5. πέμπτη ἱσταμένου	*FD* III 5 47, I.64 (as late as I A.D.-*FD* III 6 125)
6. ἕκτη ἱσταμένου	*FD* III 6 27
7. ἐβδέμα	*GDI* 2561 D
8. ὀγδόη ἱσταμένου	*FD* III 6 31 ὀγδόη *FD* III 6 126
9. ἐνάτα	*GDI* 2561 D
10. δεκάτα	*GDI* 2561 A
11. ἐνδεκάτα	*FD* III 3 235
12. δωδεκάτα	*FD* III 3 235
13. τρεισκαιδεκάτα	*FD* III 2 139
14. τετταρεσκαιδεκάτα	
15. πεντεκαιδεκάτα	*GDI* 2642.79
16. ἐκκαιδεκάτα	
17. ἐβδεμακαιδεκάτα	
18. ὀκτ(ὼ) καὶ δεκάτη	*FD* III 6 130
19. ἐννεακαιδεκάτα	
20. εἰκάς	*FD* III 5 47, I.7

No dates after 20 are attested. Earlier inscriptions tend to favor the dialect use with *alpha*, while later ones generally use the koine forms with *eta*. The use of ἱσταμένου seems to be random; early as well as late inscriptions omit it.

Quite late, not before the first century of the Christian era, the use of numerical signs began, e.g.: γʹ *FD* III 5 233; δʹ *FD* III 2 104; ζʹ *FD* III 4 47; ιαʹ *FD* III 6 128; ιβʹ *FD* III 6 137; κʹ *FD* III 4 78.

8. Ozolian Locris

Attestation for the Locrian calendars does not begin until the second century B.C., and it is only after the Locrians regained independence from Aetolia when that league was broken up by Rome in 167 B.C. that there are sufficient references to Locrian calendars to show something of their individual characteristics. A number of separate calendars are attested; in addition to a federal calendar, with months enumerated numerically as in the Phocian koinon (q.v.), there were named months in a number of cities, and in some cases at least, differences between cities can be demonstrated.

Full studies have been made by G. Daux[1] and, more recently, L. Lerat,[2] to elucidate the names and order of the months, and these present full documentation for the Locrian calendars.

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[1] G. Daux, *Delphes au IIe et au Ier Siècle*, Paris, 1936, pp. 638–640, and pp. 648–9 (table of synchronisms).

[2] L. Lerat, *Les Locriens de l'Ouest* II, Paris, 1952, Chap. IV, "Les Calendriers Locriens."

Names and Order of the Months in the Federal Calendar

The names of the months in the Federal calendar are simply ordinal numerals; all but 2, 9, and 11, are attested.

1. Πρῶτος
2. Δεύτερος
3. Τρίτος
4. Τέταρτος
5. Πέμπτος[1]
6. Ἕκτος
7. Ἕβδομος
8. Ὄγδοος
9. Ἔνατος
10. Δέκατος
11. Ἑνδέκατος
12. Δωδέκατος

Synchronisms with Delphian months show that the first of these corresponded to Boukatios at Delphi, and that the remaining months corresponded in sequence to the regular sequence of months at Delphi.

Amphissa, Physkos, Chaleion, Oianthea, Tritea, Tolophon

The following months are attested at different cities of Ozolian Locris (see p. 77).

The Count of Days

Most of the evidence about the Locrian months comes in fact from Delphi, and there are very few indigenous Locrian inscriptions. There is no evidence to elucidate the count of days.

9. *Aetolia*

The names and order of the Aetolian months have been presented by G. Daux,[2] based on the arguments of Nititsky.[3] Since the appearance of Daux' discussion in 1932, no evidence has appeared to disturb its conclusions and they have been generally accepted. The information about the calendar of Aetolia comes, as that of most of central Greece does, from synchronisms found among the manumissions at Delphi.

Names and Order of the Months

The Aetolian months are attested in synchronisms with the months of the Delphian calendar from the beginning of the second century B.C. on. As there is no conveniently available table of documentation for the synchronisms, one inscription is given for

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[1] To be added to Lerat's documentation for Pemptos is *SEG* XVI 361, ca. 150/30 B.C.

[2] *BCH* 56, 1932, pp. 320–325.

[3] A. Nititsky, *Researches in Greek Inscriptions* (in Russian), Yurief, 1901, the material available in German in Nititsky's *Die geographische Liste der delphischen Proxenoi*, Yurief, 1902.

Federal Calendar	Amphissa	Physkos	Chaleion	Oianthea	Tritea	Tolophon
Πρῶτος	Ἀγραστύων		Κάρειος	Κάρειος		
Δεύτερος			Βουκάτιος			
Τρίτος			Κοούτιος			
Τέταρτος	]τιος	Ἀράτυος				
Πέμπτος	Παναγύριος	Διονύσιος			Γιγάντιος	
Ἕκτος	Γιγάντιος					
Ἕβδομος			Λύκειος			
Ὄγδοος } ?	Ποιτρόπιος	Ποιτρόπιος	Ποιτρόπιος			
Ἔνατος }	? Ἄρειος[1]	Πόκιος				
Δέκατος	Πόκιος	Ὑχαῖος				
Ἑνδέκατος	Ἀμών		μὴν Ἀπόλλωνος			
Δωδέκατος	Πάναμος μὴν Ἀπόλλωνος[2]	Δίνων	Ἀπελλαῖος	Ἀπελλαῖος		Ἀπελλαῖος

[1] Not a certain reading; Lerat, p. 176, argues that it should be placed after Poitropios, depending upon the position which is to be assigned to that month.

[2] Cf. Lerat, p. 176. No correspondence exists for this month.

each as attestation; in all cases but that of the eleventh month there is additional documentation.

	Aetolia	Delphi	
1.	Προκύκλιος	Βοάθοος	*GDI* 1844
2.	Ἀθαναῖος	Ἡραῖος	*GDI* 2002
3.	Βουκάτιος	Δαιδαφόριος	*GDI* 1986
4.	Δῖος	Ποιτρόπιος ὁ πρῶτος	*GDI* 1853
5.	Εὐθυαῖος	Ἀμάλιος	*GDI* 1994
6.	Ὁμολώιος	Βύσιος	*GDI* 2010
7.	Ἑρμαῖος	Θεοξένιος	*GDI* 2043
8.	Διονύσιος	Ἐνδυσποιτρόπιος	*GDI* 2121
9.	Ἀγύειος	Ἡράκλειος	*GDI* 1975
10.	Ἱπποδρόμιος	Ἰλαῖος	*GDI* 2045
11.	Λαφραῖος	Ἀπελλαῖος	*IG* IX^{2} 137 (*GDI* 1908)[1]
12.	Πάναμος	Βουκάτιος	*GDI* 2000

The intercalary month was Dios, referred to as Δῖος ἐμβόλιμος, attested in *SEG* XVI 355. It was equivalent to Ποιτρόπιος ὁ δεύτερος at Delphi.

The Count of Days

Only two of the dates in the month are attested, the first and the fifteenth, νουμηνία and πέμπτα ἐπὶ δέκα in *IG* IX 1^{2} 137. From the second of these, one might assume that the middle decad of the month was made by adding ἐπὶ δέκα to the ordinal numeral, but without some more evidence it is dangerous to propose a formula.

The Aetolian calendar was in use throughout the territories of the Aetolian League, and, although the calendars of individual city-states persisted in use, one may expect to find the Aetolian calendar attested outside Aetolia in western central Greece until the dissolution of the league at the beginning of the second century B.C.[2]

10. Acarnania

Our knowledge of the calendar of Acarnania is exceedingly fragmentary. Only four months are attested, and of these only one is complete on an inscription, while two others are restored almost *in toto*.

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[1] *GDI* 1908 equates Laphraios (along with Locrian Dinon, and Oianthean Apellaios) with Delphian Poitropios. But as a large number of texts yield Dios = Poitropios, and as other texts require that the Locrian month be equated to Apellaios at Delphi, Daux (*op.cit.* p. 323) accepts Nititsky's thesis that the Delphian month is not to be understood as equated to the other months, but that the group of Locrian and Aetolian months give the date of the contract while the Delphian date is that of the inscription at Delphi.

[2] E.g., at Naupactus, *SEG* XXIII 349, 350, 344, 353, Homoloios, Dionysios, Hippodromios, Laphraios.

Κουροτρόπος	*IG* IX² 1 588
Βο[υκατίου	*IG* IX² 1 209
Πα[νάμου ἕκτ]αι ἐπ' εἰκάδι	*IG* IX² 1 582
μηνὸς Θαργηλιῶνος] πέμπτει ἀπιόντος ὡ[ς 'Αθηναῖοι – – ὡς δὲ 'Ακα]ρνᾶνε[ς] ἐπὶ στρατηγοῦ Χρέμα [μηνὸς 'Εσπερι]νοῦ τετρά[δι] ἀπιόντος,	*IG* IX² 1 p. xxix. 98 (*IG* II/III² 951 add.)

Above is the full attestation of dates of the month, and the two items, both dates at the end of the month, reflect different forms of terminology. Furthermore, neither inscription comes from Acarnania itself, and the terminology for the day-count may be unreliable.

11. *Ambracia*

Only one month is attested, Φοι]νικαιὸς, which is equated to the Acarnanian Hesperi]nos and the Athenian Thargelion in *IG* II² 951.

12. *Epirus*

At Buneima and Aiginion a single month, Γαμίλιος, is attested: *GDI* 1339, Le Bas-Wadd. II 1206b.

13. *Corcyra*

Six months are attested. Three may be placed in order, but I would not venture to place the other three.

Μαχανεύς	*IG* IX 1 694.48
Εὔκλειος	*IG* IX 1 694.57
'Αρτεμίτιος	*IG* IX 1 694.62
Πάναμος	*Asylieurk. Kos* 10 (= *SEG* XII 377)
Φοινικαῖος	*Inschr. Magn.* 44
Ψυδρεύς	*IG* IX 1 682

The count of days seems to have proceeded straight through the month. We have a ἕκτα in *IG* XIV 1 694.93, and τρίτα ἐπὶ δέκα in *Asylieurk. Kos* 10, with τετάρτα ἐπὶ δέκα in *IG* IX 1 682, τετάρτη ἐπὶ εἰκάδι *IG* XIV 1 694, and πέμπτα ἐπ' εἰκάδι in *Inschr. Magn.* 44.

14. *Epidamnus*

One month, 'Αλιοτρόπιος, is attested in *Inschr. Magn.* 46, a decree of Epidamnus.

15. *Corcyra Melaina (Issa)*

One fragmentary month name, Μα[χανεύς, appears in *Syll.*³ 141.

16. Apollonia on the Aous

A decree of Apollonia, *Inschr. Magn.* 45, provides the date Ἁλιοτρόπιος τρίτα.

17. Lamia

Names and Order of the Months

The sequence of the Lamian months has been deduced from a small number of inscriptions which list manumissions by months. The correlation of the groups of months produces a calendar, and the basic order, modified later only in detail, was presented by Bischoff,[1] founded on the publication and discussion of the inscriptions by Rhangabes.[2] The inscriptions involved appear in the corpus as *IG* IX 2 71–77.[3]

1. Βώμιος
2. Θριξάλλιος
3. Γευστός
4. Λύκεος
5. Θῦος
6. Ἄρεος
7. Χρυτταῖος
8. Ἱπποδρόμιος
9. Πάναμος
10. Ἰτώνιος
11. Ἀπελλαῖος
12. Θεμίστιος

The assignment of Bomios to first place has been based, from Rhangabes on, on the fact that this month appears, in all but one case, that of Thrixallios, *IG* IX 2 74, immediately after the naming of the magistrates. The appearance of Thrixallios once in that position persuaded Bischoff to place that month in second position.[4] Thuos, assigned to fifth place, is considered to be "*sedis dubiae*" by Hiller.[5] The tenth month, Itonios, was doubted by Bischoff, and it has not yet appeared in an unchallengable reading. For the last month, Boukatios was proposed by Bischoff, but the reading was corrected to Themistios by Hiller[6], this last month supported by an appearance of that month in *IG* IX 2 66b 2.

There is no indication of the nature or month of intercalation.

The Count of Days

Only two days are attested: δευτέρα, *IG* IX 2 69.4, and πεντεκαιδεκάτα, *IG* IX 2 61.

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[1] *Leipz. Stud.* 1884, pp. 337–341.

[2] A.R. Rhangabes, *Eph. Arch.* I, 1838, numbers 68–74.

[3] For citations, see *IG* IX 2, index vi, 4, p. 320.

Op.cit. p. 340.

[5] *IG* IX 2, index vi, 4, p. 320.

[6] *Ibid.*

18. Halos

Our information for the calendar comes from a single inscription, listing manumissions by months with the months grouped in sequences now published as *IG* IX 2 109. Again Bischoff has provided the organization of the evidence.[1] The inscription dates to the middle of the second century B.C., and in addition to preserving the evidence for the sequence of months in the Halian calendar, shows that at Halos as at Delphi, for example, the year was divided into two semesters.[2]

Names and Orders of the Months

Πρώτα ἑξάμηνος	δευτέρα ἑξάμηνος
1. Ἁδρόμιος	7. Μεγαλάρτιος
2. Εὐώνιος	8. Θεμίστιος
3. Πυθοῖος	9. Δέματρος
4. Ἁγναῖος	10. Ἑκατόμβιος
5. Διονύσιος	11. Ὁμολώιος
6. Γενέτιος	12. Θυῖος

The intercalary month was Genetios, appearing as Γενέτιος ἐμβόλιμος.

The Count of Days

Only four days are attested, all in *IG* IX 2 109: νουμηνία b.28, δευτέρα a.74, ιά a.56, τριακάς a.49. There is not enough data to reconstruct the count.

19. Meliteia

Although ten months are known at Meliteia, the lack of indication of sequence for most precludes the reconstruction of the whole calendar. In the list below, attested in the beginning of the first century of our era (for citations, v. *IG* IX 2, index vi, 4, p. 320) the order of the first four months is clear, and Genetios must come after Thuios. There is no evidence for the remaining months.

Ἀγριώνιος
Θυῖος
Τράγιος }
Βουτράγιος } Γενέτιος

Ἄφριος
Ἰτώνιος
Λεσχανόριος
Ὁμολόιος
[Πυθ]οῖος

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[1] *Leipz. Stud.* 1884, pp. 327–333; *Jahrb. f. class. Philol.* 1892, pp. 482–484.

[2] Citations for all months in *IG* IX 2, index vi, 4, p. 320.

The following days are attested: α′ *IG* IX 2 206 Ib.15; δευτέρα *IG* IX 2 206 IIIb.10; γ′ *IG* IX 2 206 Ib.8; ε′ *IG* IX 2 206 IIIc.16; ἕκτη *IG* IX 2 207b.9.

20. *Pyrasos*

At Pyrasos the year was divided into two semesters, and only the second of these, ἡ β′ ἑξάμηνος, is attested, along with five month-names, on *IG* IX 2 133. This list of manumissions presents the months in order, but without additional testimony it is not possible to know whether other months intervene between any of these: Ἁγναῖος, Κουράλιος, Ἰτώνιος, Ἱπποδρόμιος, Μεγαλάρτιος.

21. *Angeai*

Only two months are known from Angeai, on the fragmentary list of manumissions, *IG* IX 2 224. They seem to appear in the order[1] Φυλλικός, Θυῖος. Thuios is also attested in *SEG* XV 368 c.3 (*IG* IX 2 228 c.3).

22. *Miscellaneous Calendars of Phthiotis*

Month names are attested at a number of other sites in Phthiotis, but without any indication of order. These are given here, entered under the cities to which they belong, along with any dates of days which may have survived.

Hypata

Ἀρτεμίσιος	*IG* IX 2 9	εἰκ]άδι	*ibid.*
Θεμίστιος	*IG* IX 2 20		

Herakleia

Ἧατος	= Delphian Ilaios	*GDI* 1895

Phalika

Ἄρηος	= Delphian Theoxenios	*GDI* 2136

Oitaia

Ἀπελλαῖος	= Phocian Protos	*GDI* 1529	(= *IG* IX 1 227; 229; 230)

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[1] Hiller, *IG* IX 2, index vi, 4, p. 320, suggests that these may have not properly been Angeian, but might have come from the Thessalian calendar.

Phthiotic Thebes

ʼΙτώνιος	*IG* IX 2 132

Thaumakoi

ʽΑδρόμιος	*IG* IX 2 219 (= *SEG* III 470): ʽΑδ[ρομίῳ] δευτέρᾳ
ʽΕρμαῖος	*IG* IX 2 221
ʼΙτώνιος	*IG* IX 2 218
ʽΟμολώιος	*SEG* III 468: ʽΟ[μολωί]ου

Near the village of Kophi

Although all the following months come from the single inscription, *IG* IX 2 102, magistracies intervene between all but the last two, so that sequence can be assumed only for these.

ʽΑδρόμιος, ʼΑπολλώνιος, ʼΙτώνιος, Κουράλιος, .ΟΙΜΝΟC.

23. Thessaly

There is attested quite late (e.g., 131/2 A.D., *IG* IX 2 546) a calendar common to Thessaliotis, Pelasgiotis and Hestiaiotis.[1] The year was divided into semesters (cf. below for attestation) called πρώτη, δευτέρα ἑξάμηνος.

Names and Order of the Months

The order of the months is largely deduced from sequences in inscriptions; the evidence for the list below can be found in the texts indicated, and in the discussion of the individual months noted.

Πρώτη ἑξάμηνος		Δευτέρα ἑξάμηνος	
1. ʼΙτώνιος[2]	*IG* IX 2 562.15	7. Λεσχανόριος	*IG* IX 2 546.10; 561.1
2. Πάνημος	*IG* IX 2 554.2	8. ʼΆφριος	*IG* IX 2 546.16
3. Θεμίστιος	*IG* IX 2 554.2	9. Θυῖος	*IG* IX 2 546.18; 561.1
4. ʼΑγαγύλιος	*IG* IX 2 554.5	10. ʽΟμολώιος	*IG* IX 2 546.26; 563.4
5. ʽΕρμαῖος[3]	*IG* IX 2 554.8, 13	11. ʽΙπποδρόμιος	*IG* IX 2 563.6, 8, 10, 12; 561.7
6. ʼΑπολλώνιος	*IG* IX 2 554.15	12. Φυλλικός	*IG* IX 2 563.15; 561.10

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[1] The earlier investigations, deducing the commonness of the calendar, but superseded in month names and order in some respects: Bischoff, *Leipz. Stud.* 1884, pp. 326ff.; *Jahrb. f. class. Philol.* 1892, pp. 479–481.

[2] Follows Phyllikos, shown elsewhere as the last month.

[3] Hiller (*IG* IX 2, index, p. 320) was doubtful whether Hermaios followed Apollonios, or vice versa, as *IG* IX 2 276 gives the order Hermaios-Apollonios. However, as there is some indication in that text of dates out of order (Hermaios 5, 6, 5), one may choose the order in the text without any such indications. The order in *IG* IX 2 559 (Apollonios, l. 17, Hermaios, l. 22) would seem to confirm this reasoning. However, the appearance of Apollonios embolimos in *Eph. Arch.* 1913, p. 161,

The equation of the first month, from the time of Bischoff on, with Boukatios in the Delphian Calendar, based on the equation Thyos-Endyspoitropios in *GDI* 1720 (B.C. 161/0?) is called into question by another equation, Thyos-Bysios, in *FD* III 2 213 (ca. 124 B.C.). Since the terminology used in *GDI* 1720 (and restored in FD III 2 213) ὡς Θεσσαλοὶ ἄγοντι suggests that we are here dealing with the common Thessalian calendar (thus establishing, incidentally, a date in the middle of the second century B.C. for a terminus) the discrepancy in equations cannot readily be attributed to particularism in the Thessalian cities. Instead, the most reasonable hypothesis would explain the variant equations as arising from a lack of permanent accord between the two calendars. The Thessalian calendar must have been entirely independent of the Delphian in the second century B.C. so that coincidences between months changed over a period of about forty years.

Perrhaebia

Bischoff, in his discussion of the Perrhaebian calendar[1] drew up a list of months much like the common Thessalian calendar, but distinct. Since Hiller has noted[2] that two of the Thessalian months in Bischoff's list (Euonios and Hyperoios) must be taken from the Thessalian calendar, and since two months which appeared uniquely Perrhaebian in Bischoff's time (Agagylios and Apollonios) are shown by later discoveries to have pertained to and filled the gap in the common Thessalian calendar, it seems rather likely that in fact by the time of the later first century B.C. – second century of our era, to which most of the evidence dates, the common Thessalian calendar had been extended to Perrhaebia. This conclusion is supported by the fact that all the Thessalian months but Thyos are attested in Perrhaebia (cf. *IG* IX 2 index, p. 320).

Hiller also noted, however, that there is evidence for an independent Perrhaebian calendar in *IG* IX 1 689, (182 B.C.) which equates Thessalian Themistios = Dios in Perrhaebia. That the month is in fact part of an indigenous Perrhaebian calendar and not a Macedonian importation is supported by the appearance of other months in Perrhaebia not attested in Thessaly, Hyperoios embolimos (which Bischoff took as Thessalian) from Tyrnavo, *IG* IX 2 1231, late second century B.C., and Hyperoios itself in *IG* IX 2 258. In addition, there appeared subsequently to Hiller's discussion the month Πο[ή]σιος in *Eph. Arch.* 1912, p. 63, No. 90, and the month Διθυράμβιος in *Eph. Arch.* 1911, p. 130, No. 65; 1912, pp. 61 ff. from Gonnos in Perrhaebia. These months gave Bischoff ample reason to conclude (*RE* s.v. Kalender, p. 1575) that there had been an original independent Perrhaebian calendar which managed to survive alongside the common Thessalian calendar.

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seems to me the strongest argument, placing Apollonios in sixth place.

[1] *Jahrb. f. class. Philol.* 1892, pp. 481–2.

[2] *IG* IX 2 index, p. 320.

Magnesia and Pagasae

The calendar attested in Magnesia stands completely apart from those of the immediately neighboring districts, at least with regard to the names for the months. In the second century B.C. eight month names are attested (*IG* IX 2 index p. 320), all names of gods: Ἄρειος, Ἀρτεμισιών, Ἀφρωδισιών, Δημητριών, Δεῖος, Ἑρμαιών, Ἕστιος, Ἡφαιστιών. There has not yet appeared evidence to permit the assignment of order to these names. Another theophoric name, Ποσιδεών appears in *SEG* XXIII 460, along with Ἑρμαῖος, from Iolcus, and these are probably to be assigned to the Magnesian calender.

The Count of Days

Although Perrhaebia seems to have had at some time different months from those of the common Thessalian calendar, and Magnesia shows a very different list, the method of counting the days of the month seems to have been similar, with occasionally differing terminology, from Magnesia and Pagasae across Thessaly to Perrhaebia. Three decads were used, and the terminology for the last decad, λοιπῶν plus a number (ἀπὸ λοιπῶν ἑπτά, *IG* IX 2 509.10) suggests that in the last decad the count was backwards. In the table given here, the inscription attesting each date is entered under the appropriate column heading; unless otherwise noted, all inscriptions are from *IG* IX 2. Numerals are also frequently used. (v. *IG* IX 2 index p. 321).

	Thessaly	Magnesia & Pagasae	Perrhaebia
1. νουμηνία	1042.47		1293.6
2. δευτέρα	543.2		1290.2
3. τρίτη	541.10		1295.5
4. τετράς	556.9		
	τεσάρων: 276a.8		
5. πέμπτη	563.7		πένπτη: 1282.22
6. ἕκτη	276a.12		
7. ἑβδόμη	1042.34		
8. ὀγδόη			1296.5
9. ἐνάτη	1042.22		1282.30
10. δεκάτη	276a.5	1100a.3	1296.11
11. ἑνδεκάτη		1111.6	
12. δυωδεκάτη			
13. τρισκαιδεκάτη	563.11		
14. τεσσερεσκαιδεκάτη			
15. πεντεκαιδεκάτη	563.15		1231.8
16. ἑκκαιδεκάτη	279.2	ἕκτη ἐπὶ δέκα: 1110.4	
17. ἑπτακαιδεκάτη			
18. ὀκτωκαιδεκάτη			
19. ἐννεακαιδεκάτη			1301.9
20.	εἰκοστή: 302a.6	ἰκάς: 1117.5	εἰκάς: *Eph. Arch.*
21. λοιπῶν δέκα		359 c III.3	1911, p. 130, No. 65
22. λοιπῶν ἐνέα	563.13		
23. λοιπῶν ὀκτώ	563.4		

	Thessaly	Magnesia & Pagasae	Perrhaebia
24. λοιπῶν ἑπτά	509.10	ἑπτὰ λοιπαῖς: 1121.2	
25. λοιπῶν ἕξ		ἕκτῃ ἀπιόντος: 1112.2	
26. λοιπῶν πέντε	τὰ ἕκτα ἐπ' ἰκάδι: 517.10		
27. λοιπῶν τέσσαρες			
28. λοιπῶν τριῶν			1282.14
29. λοιπῶν δύω		359b.3	
30. ὑστέρα: 512.22	τὰ ὑστερομειννία: 517.40 ὑστέρα ἕνα καὶ νέα: 515.3	τριακάς: 1229.6	

24. *Skotussa*

In publishing a list of manumissions from Skotussa, later appearing as *SEG* XV 370, Pouilloux set forth some remarks about the order of the months in the calendar at Skotussa,[1] all of which appeared in the document. The months appeared in groups in different years, and although complete certainty is not possible most of the calendar can be reconstructed.

Names and Order of the Months

In the discussion to follow, the case for position must be argued for each month.

1. Πάνημος	Pouilloux considers this the first month. Panemos appears twice, B 34 and C 58, and in both instances, first after the naming of the magistrates of the year. In addition, in B 34 it comes before Leschanorios, which itself appears often in positions early in the year.
2. Θεμίστιος 3. Λεσχανόριος	Before Leschanorios, in B 11, which is after Panemos; Q.E.D., between Panemos and Leschanorios.
4. 'Απολλώνιος 5. 'Αγαγύλιος	The evidence for Apollonios, A 20, and Agagylios, A 22, only requires that they come before Aphrios, A 24–5. But, as Leschanorios appears in first place one time, A 7, and in second place two times, B 12–13, and B 37 (immediately following Panemos), it is most reasonably placed as early in the year as possible. Pouilloux, p. 450, suggested that Apollonios and Agagylios, which are respectively sixth and fourth in the common Thessalian Calendar, might have been accidentally inverted by the stone carver. But it is probably better to accept the evidence as it stands.
6. "Αφριος	A 24–5, Aphrios, A 28, Ungios (= Iungios, Pouilloux, pp. 449–450) and A 31, Homoloios, in that order. Aphrios comes after Agagylios. Iungios comes before Homoloios, in C 3, C 12–13.
7. } Θῦος or 'Ιύγγιος 8. }	Thyos, B 56, comes between Themistios and Homoloios, and so, either seventh and eighth place must be allotted to Iungios and Thyos in an uncertain order, or, Thyos must be placed in at some earlier place after Themistios, to leave eighth place for Iungios.
9. 'Ομολώιος 10. 'Ιπποδρόμιος 11. Φυλλικός 12. 'Ιτώνιος	There are no other months to interpose, so that this order seems secure. As Pouilloux notes, Itonios ends the year in four places, A 2, B 2, B 45, and B 60.

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[1] J. Pouilloux, *BCH* 79, 1952, pp. 449–451.

The Count of Days

The stone yields a rich harvest of dates, and the complete count of days can be reconstructed, with the lines of the attested dates indicated.

1.	νουμηνία	B 22	11.	? ἐνδέκατη		21.	μία ἐπ’ εἰκάδι	B 59
2.	δευτέρα	B 11	12.	δωδεκάτη	A 12	22.	? δύω ἐπ’ εἰκάδι	
3.	τρίτη	B 37	13.	τρεῖς καὶ δεκάτη	C 4	23.	τρίτη ἐπ’ εἰκάδι	
4.	τετράς	B 45	14.	τέσσαρες καὶ δεκάτη	A 28	24.	τετράς ἐπ’ εἰκάδι	
5.	πέμπτη	B 14	15.	πέντε καὶ δεκάτη	A 10	25.	πέμπτη ἐπ’ εἰκάδι	
6.	ἕκτη		16.	ἕκ καὶ δεκάτη	A 25	26.	ἕκτη ἐπ’ εἰκάδι	B 4
7.	ἑβδόμη	B 16	17.	ἑπτά καὶ δεκάτη		27.	ἑβδόμη ἐπ’ εἰκάδι	
8.	ὀγδόη	B 1	18.	ὀκτώ καὶ δεκάτη	A 20	28.	ὀγδόη ἐπ’ εἰκάδι	C 36
9.	ἐνάτη		19.	ἐννέα καὶ δεκάτη	A 7	29.	ἐνάτη ἐπ’ εἰκάδι	
10.	δεκάτη		20.	εἰκάς	B 3	30.	τριακάς ἐπ’ εἰκάδι	B 5

25. *Apollonia in Chalcidice*

Two months are attested, by Athenaeus, *Deipn.* VIII, 11 (334e), ’Ανθεστηριών and ’Ελαφηβολιών. This is probably the Apollonia which Stephanus of Byzantium (No. 22) called an Ionian city; the month names would support that, and Elaphebolion might bespeak strong Athenian influence.

26. *Cassandreia (Potidaea)*

Δημητριών	*Syll.*³ 380

27. *Byzantium*

Almost all our information about the Byzantine list comes from the *Liber Glossarum*, and most discussions of the Byzantine months are based on the list as it appears in the text of Papias.[1] Mountford, discussing the *Liber* and commenting upon the astounding spelling errors which are repeated often, e.g. *thenorum lingua* where something like *Athenaeorum lingua* must be meant, deduced that the *Liber* was ultimately based on lists of months.[2] From the texts of the *Liber*, along with Papias, Mountford deduced the following list for Byzantium:

Ianuarius	– Petagnicios	= Πεταγείτνιος	Maius	– Licios	= Λύκειος
Februarius	– Dionisius	= Διονύσιος	Iunius	– Bosporius	= Βοσπόριος
Martius	– Eiclios	= Εὔκλειος	Iulius	– Iateos	= ‘Υακίνθιος
Aprilis	– Artemesios	= ’Αρτεμίσιος	Augustus	– Agrantos	= ’Αγριάνιος

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[1] For which see L. Bröcker, "Beiträge zur antiken Monatskunde," *Philologus* 2, 1847, pp. 246–261, and especially p. 248.

[2] J.F. Mountford, "De Mensium Nominibus," *JHS* 23, 1923, pp. 102–116.

September – Malaforus = Μαλοφόριος
October – Ereo = Ἡραῖος
November – Carneios = Καρνεῖος
December – Machanios = Μαχανεύς

Ὑακίνθιος for Iateos was just a guess, and K. Hanell, reexamining the list in 1932,[1] substituted Λατοῖος, on the basis of *Inschr. Milet* 3 153, the text of the first line of which, Ἐπὶ ἱερομνάμονος Ἑστιαίου (τοῦ) Λατοίου ἐγ may be altered to Ἐπὶ ἱερομνάμονος Ἑστιαίου. Λατοίου. ἐγ at the suggestion of Wilhelm.[2] There seems little doubt of this. But Hanell's further disagreement with the *Liber* may not be so well founded. He argued that the readings which Mountford[3] took to indicate Καρνεῖος and Bischoff[4] took for Καρινός, must go back to an original Ἑρμαῖος, primarily because Καρνεῖος ought to have been a summer month.[5]

The beginning of the year is unknown. Bischoff thought that the autumnal equinox began the year, accepting Malophorios as the first month on the basis of its appropriateness in the autumn at the time of apple harvest.[6] Hanell was rightly dubious,[7] concluding that we do not know with which month the year began, although he conceded the possibility of the autumnal equinox as the beginning point.

28. Perinthus

As in the case of Byzantium, the list of months at Perinthus is filtered through the *Liber Glossarum*, with the greatest preservation through the text of Papias.[8] Mountford[9] has deduced the following list:

Ianuarius – Calameos = Καλαμαῖος
Februarius –
Martius – Leneos[10] = Ληναῖος
Aprilis –
Maius – Boedromion = Βοηδρομιών
Iunius – Croinon = Κρονιών
Iulius – Pianeption = Πυανεψιών
Augustus – Posideon = Ποσιδεών
– Sebastos = Σεβαστός
September – Antesterion = Ἀνθεστηριών
October – Artemesios = Ἀρτεμίσιος
November – Desios = Δαίσιος
December – Panemos = Πάνημος

Hanell's study,[11] striking Ληναῖος as not properly included, produced the following list: 1. Καλαμαιών 2.- 3.- 4. Βοηδρομιών 5. Κρονιών 6. Πυανεψιών 7. Ποσιδεών

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[1] K. Hanell, "Das Menologium des Liber Glossarum," *Kung. Human. Vetenskapssamfundet i Lund*, Arsberättelse 1932, p. 22.

[2] *Ath. Mitt.* 39, 1914, p. 187.

[3] *Op.cit.*, p. 112.

[4] *RE* s.v. Kalender, p. 1579.

[5] *Op.cit.*, pp. 23-26.

[6] *Op.cit.*

[7] *Megarische Studien*, Lund, 1934, p. 190. Hanell argues, p. 194, that Ἡραῖος was the first month after the autumnal equinox, and then, proceeding to discuss each month as fully as his data allows, argues again for Ἑρμαῖος *vice* Καρνεῖος on the basis of parallels elsewhere.

It is worth noting that Βοσπόριος, apparently unique at Byzantium, is attested in two unpublished inscriptions; cf. L. Robert, *Revue de Philologie* 33, 1959, p. 231, note 6.

[8] *Philologus* 2, 1847, p. 248.

[9] *JHS* 43, 1923, p. 111.

[10] Not clearly attributed to Perinthus, but first suggested for that calendar by Hermann, *Philologus* 2, 1847, p. 266.

[11] *Kung. Human. Vetenskapssamfundet i Lund.* Arsberättelse 1932, p. 21.

8. Σεβαστός 9. Ἀνθεστηριών 10. Ἀρτεμίσιος 11. Δαίσιος 12. Πάνημος, concluding that this was a local calendar of the imperial period. It may be that the calendar of which these months are part is one of those of the julian type introduced in the early empire,[1] and that we have here a calendar which included old Perinthian months (e.g. Κρονιών) along with Macedonian months and a Roman honorific month.

29. Callatis

Two months, Λυκῆος and Διονύσιος are attested in a single text, *Dacia* 1, 1924, p. 140. No. 2. In addition, Ἀρτεμίτιος appears in *Archäol. Anzeig.* 1915, p. 250, No. 4, and Πεταγείτνιος in *IGRR* I 656.

30. Chersonesus Taurica

Four months are attested:

Διονύσιος	Minns, *Scythians and Greeks*, p. 648, No. 18.
Ἡράκλειος	*ibid.*
Εὐ[κλεῖος]	*Isvestia* Imperial Archaeological Commission (Leningrad) 23, 1906, p. 61.
Λύκειος	*Inscr. Pont. Eux.* IV 70.

31. Megara

Only two months are attested at Megara, and one of these is restored. *IG* VII 223 yields the month name Τρίτος while in *IG* VII 188 we find Πα[νάμου.

32. Corinth

From the letter of Philip, quoted in Demosthenes, *De Cor.* 157, we find the Corinthian Πάνημος equated to the Macedonian Loios and the Athenian Boedromion.

33. Sicyon

Plutarch, *Aratus* 53, reports a Δαίσιος at Sicyon, and equates it to the Athenian Anthesterion, Δαισίου μηνός, ὃν Ἀθηναῖοι καλοῦσιν Ἀνθεστηριῶνα. For the beginning of the year, cf. A. Mommsen, *Jahresber. über die Class. Altertumswiss.* 44, 1885, p. 420.

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[1] See below, p. 186f.

34. *Argos*

The calendar of Argos remains poorly attested and little studied. The number of inscriptions is relatively small, and Argive institutions have not, in general, been especially examined. Thus even the limited description which may be made of the Argive calendar is subject to great uncertainty.

Names and Order of the Months

The uncertainty begins with the numbers, in a twelve-month scheme, which are to be assigned to the attested names. Although the order of some names seems secure, the evidence for assignment of numbers is so slender that it is perhaps best to suspend judgement.

Τέλεος ’Αρνεῖος	Precedes the month of Arneios in the Argive decree published by Guarducci:[1] ἀμ|β]ολίμ(ωι) ἐκ τοῦ Τελέου ’Αρνείου ἡνάται. She proposes these as Spring months, and this is accepted by Charneux,[2] who properly shifts Hermaios (q.v.).
Πάναμος	*Mnem.* 43, 1915, p. 366: ’Αγυηου ἡνάτᾳ δευτάτᾳ, ἀμβολίμῳ ἐκ τοῦ Πανάμου. That a Panamos date is deferred into Aguieos demonstrates the succession of these two months.
’Αγυίηος	*Mnem.* 44, 1916, p. 221: ἀμβολίμῳ ἐκ τοῦ ’Αγυιήου, Καρνείου ἡνάτᾳ πράτᾳ. Postponement of an Aguieos date into Karneios establishes that sequence. This is pointed out by Boethius,[3] differing slightly from Vollgraff,[4] and the sequence here is accepted by Charneux.
‘Ερμαῖος	*BCH* 82, 1958, p. 7, (*SEG* XVII 143), ‘Ερμαίου ἡνάται δ[ευτάται ἀμβο-]|λίμωι ἐκ τοῦ Καρνείου shows that Hermaios followed Karneios.[5]
’Απελλαῖος	*SEG* XVI 255. Charneux is in doubt whether to place Apellaios between Arneios and Panamos or after Hermaios.[6] There is no real evidence to indicate either.

The evidence thus shows that Teleos immediately precedes Arneios. Then, with, or without, a break after Arneios, come Panamos, Aguieos, Karneios, and Hermaios, without breaks between. Apellaios must stand unplaced. We do not know which month began the year.

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[1] *Annuario della Scuola Archeologica di Atene e delle Missioni italiane in Oriente* III–V. N.S., 1941–1943, pp. 141–151, esp. 145–147 (= *SEG* XI 1084).

[2] P. Charneux, *BCH* 81, 1957, p. 200.

[3] *Der argivische Kalender*, Uppsala Universitets Årsskrift, 1922, pp. 50–51. Boethius equates Argive Karneius with Spartan Karneios, through Thucydides V 54, and thence through Plutarch, *Nicias* 28, which offers Spartan Karneios = Attic Metageitnion, to the Attic calendar, giving Panamos = June-July, Aguieos = July-August, Karneios = August-September. These are accepted by Charneux.

[4] *Mnem.* 44, 1916, p. 51, inserting Arneios between Aguieos and Karneios.

[5] Plutarch, *Mul. Virt.* 245 E, states that the defeat of Cleomenes by the Argive women under Telesilla took place in the month called 'Fourth' in his own day, but in antiquity called Hermaios among the Argives. Boethius, unaware of the new inscription, argues (*op.cit.* p. 54) that the Achaean year began with the new moon after the Autumn equinox (October-November) and so places Hermeios in January-February (= Attic Gamelion). This interpretation of Plutarch now unacceptable (cf. Charneux, *op.cit.* p. 200), we must take the 'Fourth Month' of Plutarch to refer to the year beginning with Summer, as the Attic year.

[6] *Op.cit.* p. 202. He places it before Panamos, with (?), noting that the solution must be awaited.

The Count of Days

With the paucity of evidence there is nothing to contradict or confuse Boethius' determination of the day-names in a tri-decadal month.[1] The attestation to date is:[2]

1. πρατομηνία	
2. ὑστεραία πρατομηνίας	*IG* IV 497
3. τρίτα πρᾶτα	
4. τετάρτα πρᾶτα	*SEG* XVI 255
5. πέμπτα πρᾶτα	
6. ἕκτα πρᾶτα	*SEG* XIII 243
7. ἑβδέματα πρᾶτα	
8. Ὀγδόα πρᾶτα	
9. ἡνάτα πρᾶτα	*Mnem.* 44, p. 221
10.	
11. μέσα	or possibly δευτέρα?[3]
12. μέσα	
13. τρίτα μέσα	
14. τετάρτα μέσα	
15. πέμπτα μέσα	
16. ἕκτα μέσα	
17. ἑβδεμάτα μέσα	*Philologus* 71, 1912, p. 6
18. ὀγδόα μέσα	
19. ἡνάτα μέσα	
20.	
21.	
22.	
23. τρίτα δευτάτα[4]	
24. τετάρτα δευτάτα	*SEG* XIII 240
25. πέμπτα δευτάτα	
26. ἕκτα δευτάτα	
27. ἑβδεμάτα δευτάτα	
28. ὀγδόα δευτάτα	
29. ἡνάτα δευτάτα	*Mnem.* 43, p. 366.
30.	

35. Epidauros

The calendar of Epidauros is most extensively attested in the fourth century B.C. accounts of expenditure for construction of the asclepeium of Epidauros, *IG* IV² 108–117. The order of the months was set forth by Fraenkel in the commentary to *IG* IV 1485 (p. 341).

Names and Order of the Months

1. Ἀζέσιος (or Ἀζόσιος)
2. Καρνεῖος
3. Πραράτιος
4. Ἑρμαῖος
5. Γάμος
6. Τέλεος
7. Ποσιδαῖος
8. Ἀρταμίτιος
9. Ἀγριάνιος
10. Πάναμος
11. Κύκλιος
12. Ἀπελλαῖος

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[1] *Op.cit.* p. 64, following Vollgraff, p. 48f.

[2] Only one instance is given for each.

[3] Boethius, *op.cit.*

[4] This assumes forward count for the third decad.

The Count of Days

Only two dates are recorded in the accounts, the first and the last, *passim*, πρατομηνία, τριακάς, and this limited number of dates is probably caused by the monthly nature of the account.

36. Miscellaneous Calendars of the Argolid

The following months and days are attested among the cities of the Argolid.

Calauria

Ἀρτεμίτιος . . . ἑβδόμαι ἱσταμένου	*IG* IV 840
Γεραίστιος	*IG* IV 841

Mycenae

Ἀρνῆος . . . [ὑστερ]αίαι πρατομηνίας	*SEG* III 312
Πάναμος . . . ὑστεραίαι πρατομηνίας	*IG* IV 497

Hermione

Ξάνδικος *IG* IV 681: the inscription is so fragmentary that one is hesitant to assume that the month actually belongs to the calendar of Hermione. The name, Macedonian, may come from the period of Macedonian domination.

Aegina

Δελφίνιος	Schol. Pind. *Nem.* V, 81

By the second century B.C. the Macedonian calendar was in use on Aegina, as attested by *SEG* X 8–13.

Troezen

Γεραίστιος	Athenaeus, *Deipn.* XIV, 44 (639c)

37. Laconia

Our knowledge of the Spartan calendar is surprisingly meagre in view of the interest in Spartan institutions in antiquity. As it is, until recently most of our knowledge of the Spartan calendar derived from literary sources, and has only recently been supplemented by epigraphic evidence. And although much of our information still rests on ancient commentary, we still do not have a complete list of the months nor much of a notion of the order of the months of which we do know the names.

Names and Order of the Months

The months attested for Sparta are:'Αγριάνιος *IG* V 1 18; 'Αρτεμίσιος Thuc. V 19, *IG* V 1 11; Γεραίστιος Thuc. IV 118 ff.; Ἑκατομβεύς Hesych.; Ἡράσιος Hesych.; Καρνεῖος Plutarch, *Nic.* 28; Ὑακίνθιος *IG* V 1 18; Φλιάσιος Steph. Byz. s.v. Φλιοῦς, *IG* V 1 363. There are attested in the general area of Laconia: Ἑκατονβέο[ς *IG* V 1 511 (Near Sparta); Καρ]νείου *IG* V 1 9 (Epidauros Limera); Λαφρίωι *IG* V 1 1145 (Gythium); Λυκείου *IG* V 1 932 (Epidauros Limera); Ὑακι]νθίου *IG* V 1 1209 (Gythium). As one of these months is attested as Spartan and two others are restored with great probability as Spartan months, it seems likely that all these months are Spartan and that all Laconia used a single calendar. We should probably assume this in any case from our knowledge of Spartan history.

There is some evidence for order of the months. Agrianios is probably followed directly by Hyakinthios, as *IG* V 1 18 refers (B 8) to a period for a panagyris from Agrianios 15th to Hyakinthios 5. In 421 B.C. Artemisios 27 = Elaphebolion 25 (Thuc. V 19), and in 423 B.C. the truce which had been begun in Athens on Elaphebolion 14 was sworn in Sparta on Geraistios 12 (Thuc. V 118 ff.). The collocation of Geraistios with Elaphebolion in 423 and Artemisios with Elaphebolion in 421 is easily explained by discrepant intercalation, but without better knowledge of the procedure of intercalation in the two calendars it would not be possible to know which of the two Spartan months came first. However, the implication of Thucydides is that the Spartans swore some time after the beginning of the truce in Athens, suggesting that Geraistios 12 was later than Elaphebolion 14, and this in turn suggests strongly that Geraistios came after Artemisios. One other equation for the fifth century, Plutarch, *Nic.* 28, gives Karneios = Metageitnion as the date of the capture of Nicias, and this would indicate that Karneios came some months after Artemisios and Geraistios.[1]

Intercalation

The ephors had the authority to control intercalation; Plutarch's report (*Agis* 16) that Agesilaos inserted a thirteenth month παρὰ τὴν νενομισμένην τάξιν τῶν χρόνων and collected taxes for it suggests both an established intercalary system and, at the same time, official power to intercalate, presumably at the expense of the system. It is said that the intercalation was made every three years,[1] but I have not found the evidence to support this statement.

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[1] Not much more than this can safely be said, although Bischoff (*Leipz. Stud.* 1884, pp. 336 ff.) placed the names of six Laconian months known to him in equation to the sixth to eleventh months of the Athenian calendar. The argument for all but those discussed here is too slender for confidence; e.g. because Thargelion in Attica can be stated to be that in which οἱ τῆς γῆς καρποὶ ἀκμάζουσιν, a term paralleled by that of Steph. Byz. for Phliasios (s.v. Φλιοῦς) in which the month is said to be ἐν ᾧ τοὺς τῆς γῆς καρποὺς ἀκμάζειν συμβέβηκεν, we can conclude Phliasios = Thargelion. At best this could be accepted as an equation valid after aberrant intercalation had ended, and there was a settled time for Phliasios of which Stephanus, writing quite late, was aware. For the positions of Artemisios and Geraistios, see the discussion of B. D. Meritt, *The Athenian Calendar in the Fifth Century*, Harvard U. Press, 1928, p. 111 f., following Hermann, in placing Geraistios before Artemisios.

The Count of Days

There is a very limited amount of epigraphical evidence for the names for days in Laconia. Apart from a small number of numerals, of no value for establishing nomenclature, the following are attested:

1. νουμηνία	*IG* V 1 363
5. έ ἱσταμένου	*IG* V 1 18
10. δεκάτα	*IG* V 1 9
19. ἐννε|[ακαιδεκάται]	*IG* V 1 363
21. ἀμ]φιδεκατίᾳ	*IG* V 1 363; cf. Hesych.: ἀμφιδεκάτη. ἡ μετὰ εἰκάδα ἡμέρα, παρὰ 'Αρκάσιν
30. τριακάς	*IG* V 1 363

There are also three citations of dates in literary sources: Plutarch, *Nic.* 28, τετρὰς φθίνοντος; Thuc. V 19, τετάρτῃ φθίνοντος; and Thuc. IV 119, τετράδα ἐπὶ δέκα. Of these, the first two use different terminology for the same day, and there is no way to ascertain whether in any of these citations the count is specifically Laconian, or whether the nomenclature was in fact Athenian.

38. Arcadia

Most of our attestation for calendaric procedure in Arcadia comes from the period during which the Arcadian cities belonged to the Achaean league, when they used the Achaean calendar (q.v.), simple enumeration of months. There was, however, an indigenous calendar, but we know very little of it, and only from scattered testimony.

Names and Order of the Months

Two months, Λεσχανάσιος, Παναγόρσιος are attested at Tegea in *IG* V 2 3 29/30, of the early fourth century B.C. In addition, Hesychius reports: 'Εκατόμβαιος· ... παρ' 'Αρκάσι.

There is no reason to doubt this evidence, as Hekatombaios is attested elsewhere in the Peloponnese, so that we have in total three Arcadian months with no indication of order.

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[1] H. Michell, *Sparta*, Cambridge, 1952, p. 129.

The Count of Days

The following are attested (*n. b.* 10, for evidence of adherance to the moon in the third century B.C.):

1. νουμηνία	*IG* V 2 357 (Stymphalus, III B.C.)
7. ἑβδόμα	*IG* V 2 3 (Tegea, early IV B.C.)
10. δεκάται κατὰ σελ[άναν	*IG* V 2 357 (Stymphalus, III B.C.)
21. ἀμφιδεκάτη	Hesychius: ἡ μετὰ εἰκάδα ἡμέρα, παρὰ Ἀρκάσιν

In addition to these, there are a number of dates in Arcadia which appear in conjunction with Achaean months; they may be Arcadian but I have assumed them to be Achaean, and they are entered under the Achaean Calendar (q.v.). To this group is probably to be assigned the τρίτα ἱσταμένου in *IG* V 2 434, from Megalopolis, of the imperial period.

39. Messenia

Practically nothing is known of calendars of Messenia apart from the adherance of Messene and Andania to the Achaean calendar (q.v.) in the second century B.C. Three (?) months are attested in *IG* V 1 1447, Messene, dated by the hand to the end of the third or beginning of the second century B.C., and on the basis of these non-Achaean months, the inscription is dated to before the treaty between Messene and the Achaeans in 191 B.C.

line 2 Φυλλ. (Phyllikos?)
5 Μναστῆρος δυωδε[κάται
7 Ἀγριανίου δυωδεκ̣[άται

It should be noted that Agrianios is attested at Sparta, while Phyllikos, if this reading is correct, is Thessalian. Mnaster is not attested elsewhere, apart from a remark of Hesychius: Μναστήρ· τῶν μηνῶν οὕτω καλεῖταί τις. This collection of months suggests that the stone shows a genuine Messenian tradition, so that we need not take the presence of Agrianios to indicate a Spartan calendar in use.

In addition to these names, we have a numerical designation, μηνὸς ιβ′, κ′ from *SEG* XXIII 208, of 42 A.D.

40. Elis

The Beginning of the Year

Our information about the calendar of Elis and Olympia is hopelessly scanty and corrupt. While we have a little epigraphical data, much of what has been said about the organization of the calendar depends upon the scholia to Pindar *Ol.* III 33 and 35.

A number of conclusions can be based upon interpretation of the texts, neither of which are internally consistent in entirety or with each other, and one of which, that on *Ol.* III 33, makes no sense whatsoever unless extensively emended.[1] But that text, even unemended, seems to say that the Elean year began in the month Θωσυθιάς at the time of the winter solstice. If we were to take that uncritically we might establish that much about the Elean year, but neither the name of the month has been accepted,[2] nor much more important, the information about the beginning of the year. I have discussed the evidence extensively in connection with Olympiad reckoning (q.v.), and as I noted there (p. 193, note 3.) I suspect that the statement about the *time* of the beginning of the year reflected the situation at the time the scholiast was writing, when the Elean calendar may have been no longer in effect as an independent calendar, or if it was operating, it had reached a relationship with the seasons which it had not necessarily had in earlier times. If this is correct, we might not believe that the year began with the winter solstice, but we might accept Θωσυθιάς, or whatever version we make of that, as the first month.

All the evidence points to the summer as the period of the Olympic games, (above, p. 194) and it would be reasonable to suppose in any case that the year began at that time. Fortunately, there is some evidence; as Weniger points out, Synkellos (*Chron.* 368, 13) states that the games were held at the beginning of the year: ’Ολυμπιὰς δὲ ἐστι παρ’ Ἕλλησι τετραετηρικὸς χρόνος, οὗ κατὰ τὴν συμπλήρωσιν ἀρχομένου τοῦ ἔτους ὁ ’Ολυμπιακὸς ἀγὼν ἄγεται. This is reasonably clear, and as the misstatement of the scholiast can easily be understood and disregarded,[3] I think that it is safe to accept, with Bischoff,[4] that the year began in summer, probably with the summer solstice as at Athens. Accordingly, I list the attested months below, beginning with those in which the festival is said to have fallen.

Names and Order of the Months

’Απολλώνιος	Summer (= Mesore)	Schol. Pind. *Ol.* III, 35
Παρθένιος	(= Thoth)	
’Αθαναῖος	= Delphian Heraios (Attic Pyanepsion)	*Inschr. Olymp.* 111.2

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[1] For the texts, see p. 191, n. 3, p. 192, n. 1. The energy which has attended the emending of the text is nicely illustrated by the apparatus to Drachmann's edition, and that was in 1903. L. Weniger has discussed the text at some length, rewriting it, in "Das Hochfest des Zeus in Olympia," *Klio* 5, 1905, pp. 1–5.

[2] Emended by Boeckh to Διόσθυος *CIG* II, p. 370. Latyschew, *Über einige aeolische und dorische Kalender*, *Epigr. Unters.*, (in Russian) cf. Bischoff, *Leipz. Stud.* 1884, pp. 347 and 316, note 2, has suggested Θῦος ἢ Θυῖος which would make sense in terms of the Θυῖος in Schwyzer 425; Weniger, *op.cit.* p. 4, points out that Θευδαίσιος or Θειλούθιος are understandable in terms of the text, and these months are attested elsewhere.

[3] Weniger's evasion of the evidence of the scholiast, *op.cit.* p. 14, different from mine, is nicely subtle. He suggests that the scholiast is not saying the *year* began with the winter solstice, but the *period*, ie., using the middle-point of the year for reckoning, and he cites the practice of intercalating in midwinter as in Athens as support. I like the argument, at least for its style.

[4] *RE* s.v. Kalender, p. 1577.

’Ελάφιος	= Spring equinox, Paus. VI, 20, 1
’Αλφιοῖος	Schwyzer 419
Θωσυθιάς	1st month? Winter month? cf. above. Schol. Pind. *Ol.* III, 33
Θυῖος?	
Θυῖος	Schwyzer 425. Same as Θωσυθιάς? See above.

The month called ’Ολυνπικός, *Inschr. Olymp.* 8; 16, is probably rightly excluded from the list of actual names by Bischoff, *RE* s.v. Kalender, p. 1577, as adjectival.[1]

41. Achaea

The Achaean calendar numbered the months, and the equation Hebdomos = Endyspoitropios in *GDI* 1774 shows the relationship between the Achaean and Delphian calendars in 170–69 B.C. The year was divided into semesters, as the reference to the first semester, τᾶι πρώται ἑξαμήνωι in *SEG* XIII 273, III B.C., shows, and presumably the first six months fell in the first, and the second six into the second, semester. During the period of the prominence of the Achaean league in the first half of the second century B.C. the Achaean calendar was used in the cities of the league, and this use seems to have continued even after Achaea was made a province. Attestation in various cities is noted in the list below.

Names and Order of the Months

1. Πρῶτος		7. ῞Εβδομος	*IG* V 1 1433 Messene
2. Δεύτερος		8. ῎Ογδοος	*IG* V 2 265 Mantinea, *IG* V 2 345 Orchomenos
3. Τρίτος	*IG* V 2 274 Mantinea		
4. Τέταρτος		9. ῞Ενατος	
5. Πέμπτος	*IG* V 2 269 Mantinea, *IG* V 2 443 Megalopolis	10. Δέκατος	*IG* V 1 1433 Messene
		11. ‘Ενδέκατος	*IG* V 1 1390 Andania (Messenia)
6. ῞Εκτος	*IG* V 1390 Andania (Messenia)	12. Δωδέκατος	*IG* V 2 345 Orchomenos *IG* V 1 1425 Messene

The Count of Days

Although only a few of the dates are attested, we have a fortunate scattering, and we are able to reconstruct most of the day-count on the assumption that the appearance of an Achaean month indicates Achaean count. Attested dates are indicated below.

1.
2. δευτέρα ἱσταμένου
3. τρίτα ἱσταμένου
4. τετρὰς ἱσταμένου
5. πέμπτα ἱσταμένου
6. ἕκτα ἱσταμένου *IG* V 2 345

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[1] Weniger, *op.cit.* p. 8, pointed out that the alternating of the actual month of the festival could call for such a designation.

7. ἑβδόμα ἱσταμένου	
8. ὀγδόα ἱσταμένου	
9. ἐνάτα ἱσταμένου	*IG* V 2 443
10. δεκάτα	
11. ἑνδεκάτα	
12. δωδεκάτα	*IG* V 1 1390
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20. ἐικάς	
21. δεκάτα ἀπιόντος	
22. ἐνάτα ἀπιόντος	
23. ὀγδόα ἀπιόντος	
24. ἑβδόμα ἀπιόντος	
25. ἕκτα ἀπιόντος	
26. πέμπτα ἀπιόντος	*IG* V 2 345
27. τετρὰς ἀπιόντος	
28. τρίτα ἀπιόντος	
29.	
30. τριακοστᾶ	*IG* V 1 1433
τριακὰς	*IG* V 2 274

42. *Euboea*

From *IG* XII 9 207, which lists a number of months of different Euboean cities, with some equivalents between the cities, but distinguishing the calendars, it is clear that there was not a common calendar among the cities. In light of this it seems particularly dangerous to assume positions on the basis of similarities in the lists, either between the cities or on analogy to non-Euboean calendars. Accordingly, I list below the names attested for each city in alphabetical order, followed by any dates attested.

Chalcis

᾿Απατουριών	*IG* XII 9 207 = Areios at Histiaia?
῾Ιππιών	*IG* XII 9 207
Ληναιών	*IG* XII 9 207 = Lenaion at Eretria
᾿Ολυ[. . .]ιών	*IG* XII 9 900b
Ταργηλιών	*IG* XII 9 900c
δωδεκάτη	*IG* XII 9 207
τετρὰς ἐπὶ δέκα	*IG* XII 9 900c
ι καὶ θ	*IG* XII 9 932
εἰκάς	*IG* XII 9 207

Eretria

᾿Ανθεστηριών	*IG* XII 9 189
᾿Απατουριών	*IG* XII 9 223
῾Ιππιών	*IG* IX 4 1065b = Plynterion at Paros, *IG* XII 5 p. 308
Ληναιών	*IG* XII 9 207 = Lenaion at Chalcis
τετράς	*IG* XII 9 234
πέμπτη	*IG* XII 9 234
δεκάτη μετ' εἰκάδα	*IG* XII 9 207
τετρὰς φθίνοντος	*IG* XII 9 189
πέμπτη ἀπιόντος	*IG* IX 4 1065b

Histiaea

῎Αρειος	*IG* XII 9 207 = Apatourion at Chalcis?
Δημητριών	*IG* XII 9 207
. . . ἱσταμένου	*IG* XII 9 207

Carystus

Βουφονιών . . . ὀγδόη ἀπιόντος *IG* XII 9 207

Bischoff, *RE* X, 1583, s.v. Kalender, attempted to bring some order out of this chaos with the introduction of the months listed in a document of loan (IV B. C.) which Walter Kolbe had reported to him. This text, of unknown provenance, contained the following months: (Thargelion) Kalamaion, Kykleion, Boedromion, Kyanopsion, Posideon, and on analogy to Athens and other Ionian calendars, Bischoff created a list (*RE* X, 1591) which accepted this group, around which were fitted the attested Euboean months. The list still had two unplaced months, and allowed for the fact, which Bischoff recognized, that a single calendar was not used by the various cities. With the names from the non-Euboean? inscription italicized, I indicate Bischoff's list: *Posideon*, Lenaion (Chalcis, Eretria), Anthesterion (Eretria), Areios (Histiaia), Targelion (Chalcis) = Ippion (Eretria), *Kalamaion*, *Kykleion*, *Boedromion*, *Kyanopsion*, Apatourion (Chalcis, Eretria), with Oly(nth)ion (Chalcis), and Demetrion (Histiaea) unplaced. Bischoff omitted the Bouphonion of Carystus from his considerations. This reasoning by Bischoff seems to me so speculative, depending as it does upon months not really attested in Euboea, and interweaving Euboean months on the basis of analogies and leaving three months with uncertain place, that I prefer to give only the lists at the separate cities.

43. *Peparethos*

Πιθοικιών = Athenian Hekatombaion, *IG* XII 8 645, 117/8 A.D.

44. *Delos*

Delos, although a dependency of Athens from the fifth century to 314 B.C., and annexed by Athens in 166 B.C. after a period of independence, maintained until 166 a separate calendar with a number of months different in name from those of Athens. The calendar year began after the winter solstice, and the first month of the Delian calendar, Lenaion, corresponded roughly with the Attic Gamelion.[1]

Names and Order of the Months[2]

1. Ληναιών
2. Ἱερός
3. Γαλαξιών
4. Ἀρτεμισιών
5. Θαργηλιών
6. Πάνημος
7. Ἑκατομβαιών
8. Μεταγειτνιών
9. Βουφονιών
10. Ἀπατουρίων
11. Ἀρησιών
12. Ποσιδεών

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[1] The correspondences, Athens = Delos, as presented by A.B. West, *Am. Journ. Arch.* 38, 1934, after the studies by Homolle (n. 2) and Dinsmoor (*Archons*, 1931) are: Hekatombaion = Hekatombaion, Metageitnion = Metageitnion, Boedromion = Bouphonion, Pyanepsion = Apatourion, Maimakterion = Aresion, Posideion = Posideion, Gamelion = Lenaion, Anthesterion = Hieros, Elaphebolion = Galaxion, Mounichion = Artemision, Thargelion = Thargelion, Skirophorion = Panamos. This is normal relationship, without regard to intercalation.

[2] First set forth by Th. Homolle, *BCH* 5, 1881, pp. 25–30, on the basis of an inscription which appears as *IG* XI 2 203.

Intercalation

The intercalary month was Panemos, called Πάνημος ὕστερος.[1] Dinsmoor has argued[2] that there was a sixteen year cycle (q.v.) like that described by Geminus VIII, 36–39. Dinsmoor obtained evidence for the nature of the following years from records of salaries and references to intercalary years:

ca. 314 I
ca. 307 O
299 O
295 I
281 O
280 O
278 O
277 I
ca. 276 O
ca. 274 O
273 I
268 O
267 O
261 I
257 I
249 O
245 I
230 O
ca. 222 O
200 O
193 I
ca. 181 I
179 O
177 I
173 I
171 O
170 I
169 O

West has challenged Dinsmoor's argument for the sixteen year cycle as "not certainly proved."[3] Without a sure knowledge of the nature of intercalation in each year, and without solid information of the method of determination of month-lengths,[4] the assignment of julian equivalents to Delian dates can only be approximate.[5]

The Count of Days

Although there are similarities to Athens in the count of days, the Delian calendar had some differences in the terminology for days. The calendar was tri-decadal as at Athens, and there is evidence for each decad to show identity with the Athenian count. This would suggest that the Athenian count of days (q.v.) may be used as a pattern for the Delian calendar. There is evidence for some variances, notably in the third decad, so that the table presented here is basically the Athenian system with the variants accepted or acknowledged.

1. νουμηνία
2. δευτέρα *Inscr. Del.* 442 A.129[6]
3. τρίτη ἱσταμένου
4. τετρὰς ἱσταμένου
5. πέμπτη ἱσταμένου *Inscr. Del.* 442 A.61
6. ἕκτη ἱσταμένου

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[1] E.g., *Inscr. Delos* 290.4.

[2] *Archons*, 1931, pp. 504–506, on the basis of references to intercalary years, years of 13 months and 13 month salaries, in the Delian expense accounts.

[3] *Am. Journ. Arch.* 38, 1934, p. 9.

[4] Dinsmoor, *Archons*, 1931, p. 504, states (without evidence), "It is evident, however, that the calendar was a lunisolar one and hence that the months began with the new moon, as at Athens." What one needs to know is whether the beginning was controlled by observation or by some other technique.

[5] On the basis of synchronisms with the Athenian calendar in *IG* I², 377, Dinsmoor found 433 B.C. intercalary, and pointed out agreement with the cycle (*Archons* 1934, p. 506). West (*op.cit.* p. 9) having argues that 433/2 was *not* intercalary, points out that the evidence for projecting a Delian 16 year cycle back into the fifth century is considerably weakened.

[6] Meritt (*Year* p. 46) knows of no instance in which ἱσταμένου was omitted in the preamble of an Attic decree, but notes the occurrence of simple δευτέραι as the second day, in *IG* I², 304B.55.

7. ἑβδόμη ἱσταμένου
8. ὀγδόη ἱσταμένου
9. ἐνάτη ἱσταμένου
10. δεκάτη ἱσταμένου *IG* XI 2 224.8/9
11. ἑνδεκάτη
12. δωδεκάτη *IG* XI 2 224.8
13. τρίτη ἐπὶ δέκα
14. τετρὰς ἐπὶ δέκα
15. πέμπτη ἐπὶ δέκα
16. ἕκτη ἐπὶ δέκα
17. ἑβδόμη ἐπὶ δέκα
18. ὀγδόη ἐπὶ δέκα
19. ἐνάτη ἐπὶ δέκα *Inscr. Del.* 298.185
20. εἰκάς *Inscr. Del.* 442 A.59
21. δεκάτη ἀπιόντος cf. 25
or φθίνοντος cf. 29
or μετ' εἰκάδας cf. 27
22. ἐνάτη ἀπιόντος
23. ὀγδόη ἀπιόντος
24. ἑβδόμη ἀπιόντος
25. ἕκτη ἀπιόντος *Inscr. Del.* 500 B.13
26. πέμπτη ἀπιόντος
27. τετρὰς ἀπιόντος; τετράδι [μετ' εἰκάδας *Inscr. Del.* 298.190
28. τρίτη ἀπιόντος *Inscr. Del.* 442 A.62
29. δευτέρα ἀπιόντος; δευτέραι φθίνοντος (full) *Inscr. Del.* 298.196
29. ἕνη καὶ νέα (hollow)
30. ἕνη καὶ νέα

Termination of the Independent Delian Calendar

The Romans, after the conclusion of the war with Perseus, in 166 B.C. handed Delos over to the Athenians,[1] who removed the inhabitants and settled cleruchs in the island. The end of Delian independence marked also the end of a separate Delian calendar;[2] the rapid assimilation to the Athenian system, dating by prytanies and Athenian months, is notable in the inscriptions after that date.[3]

45. Tenos

The basis of the study of the calendar of Tenos is *IG* XII 5 872, the long and much damaged catalogue of sales of the third century B.C. The sales, which are listed by month, were all made in the same magistracy year, and as the months appear in two series, the text not only gives us most of the month-names but also tells us a good deal about the order within the year. There are also enough single days named to tell us something about the count of days.

From two other inscriptions we learn that the year was divided into semesters. In *IG* XII 5 883 we find the πρώτην ἑξάμηνον and in *IG* XII 5 886 δευτ]έραν ἑξάμηνον.

Names and Order of the Months

The catalogue of sales was known to Bischoff in 1884, but there were for him, as there must be for us, some uncertainties. The list begins, naming the archon Ameinolas, with the month Artemision, and after running through the series ending with Anthesterion, a second series begins again with Artemision in line 48. This would make it appear that the year began with Artemision. However, Bouphonion follows the repeated name of the archon in line 103 and again in 109, and this induced Bischoff to leave open the question of which began the year.[1] The problem is further complicated by the fact that only nine months are represented intact on the stone, inducing Bischoff to propose three, Taureon, Kyanopsion, and Lenaion, analogical to their appearance in other Ionian calendars. However, as none of these three have ever turned up among the (admittedly very scanty) Tenian inscriptions, Bischoff's suggestions remain conjectural. It is worth noting in this connection that *no* new names have turned up subsequent to Bischoff's discussion.

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[1] Polybius XXX, 20.

[2] Cf. Dinsmoor, *Archons* 1931, p. 506 (and n. 2 *ad loc.* for citations).

[3] E.g. *Inscr. Del.* 1497 bis.

As Bischoff himself noted, the precise determination of place for even the attested months is not certainly fixed. His locations depend, more or less, on analogical reasoning. In the discussion which follows, line numbers refer to *IG* XIII 5 872.

'Αρτεμισιών	The limited indications of the text suggest this to be the first month: it appears first, l. 2; in its second appearance, l. 48, it is marked off clearly from the preceding Anthesterion.
. . . . . .] Ταργηλιών or 'Απελλαιών	This may be intended in l. 5, which is restored Ταυρε?ων]ος and in any case, it follows Artemision, l. 69. It may precede Apellaion, l. 15, and if it is to be restored in l. 5, it certainly does so. It may, however, follow Apellaion.
'Ελειθυαιών	Follows Targelion and precedes Heraion, l. 75. It may be that Apellaion follows Eleithuaion.
'Ηραιών Βουφονιών 'Απατουριών Ποσιδεών 'Ανθεστηριών	These months follow consistent orders in both series: Heraion, l. 22 and l. 78; Bouphonion, l. 35 and l. 103; Apatourion, l. 38 and l. 121; Poseideon, l. 44; Anthesterion, l. 48. If, as seems reasonable, the conjunction of Bouphonion with a second mention of the magistrate of the year indicates the Bouphonion began the second semester, or at least that Artemision began one and Bouphonion the other semester, there would be room for six months, beginning with Artemision, to make Bouphonion the seventh month in the series. If Bouphonion is the seventh month in a series of which Artemision is the first, then something other than Targelion must be restored in l. 5 in order to create the requisite number; one of the three missing months would go there, and the other two missing months would go somewhere between Bouphonion and Artemision. It seems better to leave these uncertainties, in preference to the analogical assignments of Bischoff, *Leipz. Stud.* 1884, p. 390; Artemision, Targelion, ?Eleithuaion, ?Apellaion, Heraion, Bouphonion, (Kuanopsion), ?Apatourion, Poseideon, (Lenaion), Anthesterion, (Taureon).[2]

The Count of Days

Although only a few days are attested, there are enough to show the count for the first decad, given here with attestation. Thereafter, the evidence is to scanty for much certainty.

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[1] *Leipz. Stud.* 1884 p. 393.

[2] It should be noted that in *IG* XII 5 824, Apatourion is equated to Rhodian Sminthios.

1. νουμηνία	*IG* XII 5 875.23
2. δευτέρα ἱσταμένου	*IG* XII 5 872.40
3. τρίτη ἱσταμένου	
4.	
5. πέμπτη ἱσταμένου	*IG* XII 5 872.103
6. ἕκτη ἱσταμένου	*IG* XII 5 824.32
7. ἑβδόμη ἱσταμένου	
8. ὀγδόη ἱσταμένου	*IG* XII 5 872.45
9. ἐνάτη ἱσταμένου	
12. δωδεκάτη	*IG* XII 5 872.122
15. πέμπτη ἐπὶ δέκα	*IG* XII 5 824.1
πέμπτη διχομηνία	*IG* XII 5 872.43
29/30. ἕνη καὶ νέα	*IG* XII 5 872.75

46. Ceos

Practically nothing was known of the calendar of Ceos before the publication in 1924 of the registry of loans now known as *IG* XII Suppl. 236,[1] of the fourth century B.C. Even this stone with six months presumably in order leaves our information incomplete, and as there is little epigraphical material known from Ceos, we have not yet come to a complete listing of months.

Discussion of the calendar has presumed that all cities on the island used the same calendar, but while this is most likely, no evidence can be brought to bear on the question. *IG* XII Suppl. 236 probably comes from Coresia, and one other month is attested there; in addition, one month, Bakchion, is attested twice at Poiessa and another, Hermaion, twice at Iulis.

Names and Order of the Months

The six months in *IG* XII Suppl. 236 are:

Θαργηλιών	l. 1
Καλαμαιών	l. 5: Καλαμ]αιῶνος Preuner, p. 142, cites Kalamaion in Miletus
Κυκλειών	l. 9
Βοηδρομιών	l. 12
Κυανοψιών	l. 15
Ποσιδειών	l. 18

Despite Preuner's suggestion to the contrary,[2] it seems likely that Thargelion is early in the year. All other month entries begin at the left edge of the stone, and the fact that Thargelion is placed offset to the right, with room for the magistrate just before the break]τος brings a slight presumption in favor of this interpretation. This is strengthened by the apparent range of the months. If the months correspond in the position in the year to their Attic equivalents, as Preuner places them,[3] then the period covered is one of eight months, and the presumptive placement of Thargelion towards the beginning would seem more likely.

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[1] E. Preuner, "Aus alten Papieren," *Ath. Mitt.* 49, 1924, pp. 139–142.

[2] *Op.cit.*, p. 140.

[3] *Ibid.*

Three other months are attested. Μαιμακτηριών in *IG* XII 5 647, Coresia, III B.C., sets up regulations for a festival; Preuner, p. 141, notes that the terminology (l. 33 f.) τὰ δὲ ὅπλα παρασκευάζειν τοὺς προβούλους τοὺς ἐξιόντες καὶ παραδιδόναι τοῖς ἐφισταμένοις, has been taken to suggest that Maimakterion came soon after the new year, or, conversely, soon before; and that if either be the case, the new year ought to come at around this time. On this basis, Preuner placed Maimakterion immediately before Poseideon, in the same position it found in the Attic calendar.

At Poiessa the month Βακχιών appears in *IG* XII 5 568 and 1100, late V or early IV B.C., and Preuner places this month two months after Posideon. The last attested month, Ἑρμαιών, *IG* XII Suppl. 235, III B.C., and *IG* II^2 1128, ca. 350 B.C., both from Iulis, is left unplaced by Preuner.[1]

The Count of Days

There is little evidence of the count of days. The following are attested:

ἐνάτη	*IG* XII 5 595 A.26
δεκάτη	*IG* XII 5 568.5
τρίτη ἐπὶ δέκα	*IG* XII Suppl. 235.7
πέμπτη ἐπὶ δέκα	*IG* XII 5 593 C.28/30
ἐνάτη ἀπιόντος	*IG* XII 5 647.4

47. Miscellaneous Cycladic Calendars

There is partial attestation for the calendars of a number of the cycladic islands, but it is so fragmentary that it is possible to reconstruct nothing of the orders of months. For these islands, I give below lists of months in alphabetical order along with evidence for count of days.

Paros – Oliaros

Ἀνθεστηριών	Paros	*IG* XII 5 112
	Oliaros	*IG* XII 5 471
Βοηδρομιών	Oliaros	*IG* XII 5 471
Θαργηλιῶνος [ὑσ]τέρου | τετράδι ἱ[σ]ταμένου	Paros	*IG* XII 5 135
Πλυντηριών	Paros	*IG* XII 5 128 add.
Ποσιδεών	Paros	*Syll.*^{3} 562

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[1] Preuner's placement, with Attic equivalents is: Thargelion = Thargelion, Kalamaion = Skirophorion, Kykleion = Hekatombaion, Metageitnion, Boedromion = Boedromion, Kyanopsion = Pyanepsion, (Maimakterion) = Maimakterion, Poseideon = Poseideon, l. – = Gamelion, (Bakchion) = Anthesterion, (Hermaion), unplaced. This table, including Samian equivalences, is followed by Hiller, *IG* XII Suppl. p. 117, with the addition of Delian equivalences (for which, read Bouphonion vice Boedromion).

Mykonos

Four months appear in sequence in *Syll.*³ 1024, although not necessarily following directly one upon the other. The four are:

Ποσιδεών
Ληναιών
Βακχιών
Ἑκατομβαιών

In the same text are attested the following dates; ἑβδόμη ἱσταμένου, δεκάτη, ἑνδεκάτη, δυωδεκάτη, πέμπτη ἐπὶ δέκα.

The terminology suggests that the count of days proceeded forward through at least the first two-thirds of the month, but evidence lacks to inform about the last ten days.

Naxos

Ἀρτεμίσιος	*IG* XII 5 38 (Rhodian Calendar?)
Ἑκατομβαιών	*IG* XII 5 T 1432 = Miltophorion in Arkesine (*IG* XII 7 67.36)
Κρονιών	*IG* XII 5 45

Ios

Ὁμερών ις	*IG* XII 5 15
Πλυντηριών	*IG* XII 5 1010
]ι̣ῶ̣ν̣[ος	*IG* XII 5 1008;]ῶ̣νος δεκάτηι ἱσ[ταμένου *IG* XII 5 1006

Andros

Ἀρτεμισιῶνος | τρίτηι ἀπιόντος	*IG* XII Suppl. 249; Artemision is the only month attested, and appears also in *IG* XII 5 715, 717, Suppl. 248.
τετράδ[ι] | ἐ[πὶ] δέ[κ]α	*IG* XII 5 716

Siphnos

Μα[ιμ]ακτηρ[ιῶν]ος	*IG* XII Suppl. 227

48. Amorgos

In the three cities of the island for which we have evidence, Arkesine, Aigiale, and Minoa, the same calendar seems to have been in use. The coincidences of months in the three cities attested by the references below make it unlikely that the three cities used different calendars.

The calendar of Amorgos has had not inconsiderable discussion. Delamarre's discussion of the main inscription proposed placement for some of the months,[1] which

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[1] J. Delamarre, *Revue de Philologie* 25, 1901, p. 180, n. 8: 1, Miltophorion, 7, Eiraphion,

Bilabel followed in great measure.[1] Bischoff's list in *RE*[2] suggested a complete list on the basis of some analogies. Acknowledging Bischoff's doubts about the placement of attested months, and aware of the insertion by analogy, I am unwilling to set a list, apart from some instances or order shown by one inscription, so that the names which follow the grouped list are placed in alphabetical order.

Εἰραφιών 'Ανθεστηριών Ταυρειών Θαργηλιών	*IG* XII 7 62, IV B.C., regarding planting in a temenos: the ditches are to be dug in Eiraphion, for first hoeing in Anthesterion, second hoeing in Taureon, so the months must come in that order. Payment is to be made in Thargelion, and the editor (*IG* XII 7, index p. 142) takes this to be the last month of the year. Since all the farming is to take place before it, it must in any case follow the preceding three months. Anthesterion = Artemitios, Astypalaea, *IG* XII 7 67. Taureion, Aigiale, *IG* XII, 7, 515.104
'Απατουριών	*IG* XII 7 515.1 (e. saep.) II B.C., Aigiale
'Αρτεμισιών	*IG* XII 7 493, II B.C., site uncertain.
Βοηδρομιών	*IG* XII 7 60, IV–III B.C., Arkesine
Κρονιών	*IG* XII 7 237.46, I. B.C., Minoa
Ληναιών	*Ath. Mitt.* 16, 1891, p. 180, No. 11: on the island of Kuphonisi, outside the harbor of Amorgos
Μιλτοφοριών	*IG* XII 7 67, II B.C., Arkesine (= Hekatombaion, Naxos); *IG* XII 7 389, II B.C., Aigiale
Πάνημος	*IG* XII 7 237.48, I B.C., Minoa *IG* XII 7 61, Arkesine (? Παν]ήμου)

The Count of Days

νουμηνία	*IG* XII 7 515.75
. . . ἱσταμένου	*IG* XII 7 44
πρὸ εἰκάδος	*IG* XII 7 237.8; 62.10
εἰκ[οσ]τε[ῖ	*IG* XII 7 44.19
. . . ἀπιόντος	*IG* XII 7 44.17

49. The Doric Sporades

As the epigraphical representation of these islands is slight, there is little evidence for the calendars of the island cities in the south Aegean. The months and dates are listed here under the islands on which they are attested. For the other Doric calendars, cf. particularly pp. 92ff., 107ff., and 134ff.

8, Anthesterion, 10, Taureion, 11, Thargelion, all for Arkesine, with an unplaced Panemos and 12, Kronion for Minoa, and for Aigiale, 5, Apatourion.

[1] Bilabel, *Die ionische Kolonisation*, 1920, p. 166: for Arkesine and Aigiale: 1, Miltophorion?, 2, Panemos (= Hekatombaion) at Minoa, 3, – – – (= Kronion at Minoa), 4, Boedromion, 5, ---, 6, Apatourion, 7, ---, 8, Eiraphion?, 9, Anthesterion, 10, Artemision, 11, Taureon, 12, Thargelion.

[2] S.v. Kalender, p. 1585: 1, Miltophorion, 2, (Metageitnion), 3, Boedromion, 4,? Kronion, 5, Apatourion, 6,? Eiraphion, 7, (Lenaion), 8, Anthesterion, 9, Artemision, 10, Taureon, 11, Thargelion, 12, Panemos.

Thera[1]

’Αρτεμίτιος	*IG* XII 3 452; 436.15
Δελφίνιος	*IG* XII 3 330.63,133
Διόσθυος	*IG* XII 3 330.109,270
’Ελευσύνιος	*IG* XII 3 330.39,70
Πανά]μου	*IG* XII Suppl. 154
‘Υακίνθιος	*IG* XII 3 436; = August in 149 A.D., *IG* XII 3 325
τετα[ρτ]	*IG* XII 3 450
πέμπτα ἱσταμένου	*IG* XII 3 436
ἑβδόμα	*IG* XII 3 329
δεκάτα	*IG* XII 3 330.271
? ἱσταμένου δω[δεκάτα	*IG* XII Suppl. 154
ἐννεακαιδεκάτα	*IG* XII 3 330.66
εἰκάς	*IG* XII 3 330.67; hικάδι: *IG* XII Suppl. p. 86, no. 1324
ἀμφεικάς	*IG* XII 3 330.68
τετάρτα πεδ’ ἰκάδα	*IG* XII 3 452
ἕκτη λήγοντος	*IG* XII 3 325; 149 A.D.

Astypalaea

’Ιοβάκχιος	*IG* XII 3 169; Suppl. 150, ib. 19: τριακάς *IG* XII 7 67
Λευ-	*IG* XII 3 174
’Αρ|τ]εμισίου δευτέραι	Date of Smyrna? *IG* XII 3 172

’Αρτεμι[τίου] = Anthesterion, Amorgos, *IG* XII 7 67

50. Rhodes

The evidence for the Rhodian months is plentiful, coming from a multitude of inscriptions and hundreds of amphora handles. We have all the names of the months and have the count of days well attested. However, our knowledge of the organization of the months is not as secure as we should like to have it. Very few inscriptions give sequences of months, and there is little discussion of the Rhodian calendar in the ancient literary sources.

The Names and Order of the Months

Because of the quantity of evidence and uncertainty of interpretation, and because of the relevance of the Rhodian calendar to that of other Dorian settlements in the islands and in Caria, the Rhodian calendar has been much studied. The fundamental document is *IG* XII 1 4, a calendar of assignments for contribution of oil to the gymnasium, which lists by day and month the names of people assigned. The inscription is unfortunately fragmentary, but by reconstructing the original organization of the stone Paton[1] was able to identify with certainty the 6th, 7th, 9th, 10th, and 13th (intercalary) months, and these identifications have formed the basis for all subsequent discussion. Paton also argued the reconstruction of the calendar on the basis of quantities of amphora handles, arguing that months represented by a high number of amphora handles should be grouped together, while those with a smaller quantity should fall together. This technique was refined by Nilsson.[2] Pointing out that Pliny (*Nat. Hist.* XXXV, 49) says that spring is the best time for making brick-tile, and that Vitruvius (II, 3) says that the drying of bricks should take place in the spring and autumn, as the summer sun dries too rapidly, Nilsson grouped the months seasonally in accordance with the quantities of amphoras which pertain to the several months. This order, supplemented by some other evidence cited by Nilsson, was the order accepted subsequently.[3] There has also been some small confirmation of the Nilsson order.

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[1] No attempt is made here to present any order of months, as the arguments, based on *IG* XII 3 830, presenting the order Diosthyos, Eleusinios, Delphinios, seem to me to be too slight; cf. the discussions of Hermann, *Monatskunde*, p. 117, and Bischoff, *Leipz. Stud.* 1884, p. 371.

The Rhodian year was divided into semesters, called χειμερινὰ ἑξάμηνος and θερινὰ ἑξάμηνος.[4] This division is of some assistance in the placement of months. In the list given below, the argument for placement is given next to each month, save that the mere reference to either *IG* XII 1 4 or to a number of amphora handles shall suffice to indicate the basis for placement. The number after each month is the number of amphora handles cited by Nilsson, p. 132.

1. Θεσμοφόριος	262	Assigned by Hiller (*IG* XII 1 p. 9; *RE* Supp. 5, p. 745) to first place on the basis of *IG* XII 1 3, which requires that the catalogue of oil contributions be set by Thesmophorios 3; Hiller reasons that the month so indicated must be the first month. Nilsson (p. 130, n. 1) rejects the reasoning, but accepts the assignment on different grounds: he had only two months left to assign, and one, Dalios, belonged in the spring; *IG* XII 1 4 called for a month in the fifth place before Sminthios, and therefore that had to be Thesmophorios.
2. Διόσθυος	64	These three, having in common the low number of amphora handles, belong together. Nilsson (p. 129) arrived at the order on the basis of the order of months at Cos (q.v.) in which Theudaision clearly preceded Pedageitnyos immediately (*Inscr. Cos* 36 a.14–16). Pedageitnyos was in the winter semester: *Öst. Jahresber.* 7, 1904, pp. 92 ff.
3. Θευδαίσιος	29	
4. Πεδαγείτνυος	70	
5. Βαδρόμιος	148	*SEG* III 674B, Badromios follows Pedageitnyos. This completes five months, required to fall before Smintheos by the available space in the reconstruction of the original state of *IG* XII 1 4.

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[1] W.R. Paton and E.L. Hicks, *The Inscriptions of Cos, Oxford*, 1891, pp. 328 ff.

[2] M.P. Nilsson, Exploration archeologique de Rhodes (Fondation Carlsberg) *Oversigt K. Danske Videnskabernes Selskabs, Forhandlinger* 1909, pp. 121 ff.

[3] Hiller, *RE* Suppl. 5, p. 744; Bickerman, *Chronology* 1968, pp. 20–21. Bischoff, writing before Hiller in *RE* s.v. Kalender, p. 1582, differed, placing Sminthios 2nd, thus moving the months Diosthyos-Badromios one month later in position.

[4] *Inscr. Lindos* 707.8; *IG* XII 1 94.11; *IG* XII 1 95b.5.

6. Σμίνθιος	269	*IG* XII 1 4
7. 'Αρταμίτιος	418	*IG* XII 1 4
8. 'Αγριάνιος	485	The placement (Nilsson, p. 125—126) depends upon rather more distant analogy, a procedure which Nilsson himself (p. 137) notes has its dangers; the analogy: Agrianios comes after Artemitios at Epidauros (q.v.) and comes before Hyakinthios at Sparta (*IG* V 1 18b.8).
9. 'Υακίνθιος	466	*IG* XII 1 4
10. Πάναμος	556	*IG* XII 1 4
11. Καρνεῖος	143	Placed by Nilsson on analogy to the position of Karneios (= Attic Metageitnion, p. 131) in the summer, when there would be a slacking of manufacture of pottery, according to the recommendations of Pliny and Vitruvius. The assignment is in a measure confirmed by *Rhod. Per.* 8, in which a lease signed in Panamos, to begin in Karneios of the following year, was to run for fifty years at an annual rent of 240 drachmas to be paid in a single installment each year. The payment was due in Panamos, and this would suggest that Panamos was the end of the rental period, i. e., the month before the beginning of each term, and that thus Karneios followed directly upon Panamos.[1]
12. Δάλιος	437	Dalios was in the summer semester (*Öst. Jahresber.* 7, 1904, p. 92ff.). The rise in the number of amphora handles accords with the expected resurgence of manufacture in the autumn.
Intercalary Πάναμος B		*IG* XII 1 4. Nilsson suggests (p. 130) that we should have a proportion 8:3 between the number of amphora handles for Panamos A and B, whereas we have actually a proportion 10:1 with the 53 known; he concludes that the total of 556 for Panamos must include some for Panamos B. He also suggests (p. 123) that the appearance of Panamos B last in *IG* XII 1 4 need not mean it came in 13th place, but that the intercalary month might have followed Panamos directly, although listed last so as not to interrupt the order of the months in the inscription.

The official year, at least as represented by *IG* XII 1 4, and probably also by the appearance of Thesmophorios as the month in which the catalogue of contributions of oil is to be set,[2] began with Thesmophorios and ended with Dalios. At least such was the official year in the late first century of our era if *IG* XII 1 4 used the official year and if the reconstructions of that stone and of the order of months are correct. There is good evidence that the official year in the second century B.C. was different. In *SEG* III 674, of the second century B.C., the months Karneios, Panamos (intercalary) Pedageitnyos, and Badromios come in succession, all in the year of Archinos showing that the year did not change between Karneios and Badromios.[3] That the summer semester came before the winter at this time is shown also by *Syll.*³ 644/5, ca. 172 B.C., in which the year did not change between Dalios and Badromios. Hiller (*RE* Suppl. 5, p. 745) accepted these disparate official years as evidence of a reform which took place sometime between 172 B.C. and the first century of our era.

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[1] In *SEG* III 674 B, the Πα[ν]ά[μου ἕκται· Θε] which follows Karneios is taken to be the intercalary Panamos by Maiuri, *Annuario* 4/5, p. 227.

[2] Nilsson's caution in not accepting the two inscriptions *IG* XII 1 3 and 4 as coming from the same epoch (p. 131 n. 1) may be justified. Yet there is still great temptation to accept, with Hiller (*RE* Suppl. 5) the evidence as coming from the beginning of the year and the setting up of the catalogue.

[3] The suggestion that the Panamos here is intercalary is Maiuri's, *Annuario* 4/5, p. 232.

The Count of Days

Although *IG* XII 1 4 lists most of its days in numeral count, we do get some names of dates, which, along with the dates in other inscriptions, give attestation to most of the days. Far more important, *IG* XII 1 4 with its clear numeral notation clearly demonstrates the nature of the backward count in the last decad of the month. The count from 20, κ, and 21, κα, is unmistakable, from 23, κθ through κη, κζ, κς, κε, κδ, to κγ, 28. κβ is never written, instead; in a 29 day month, the "29" is simply omitted, for the 29th to be τριακάς, while in a 30 day month we have προτριακάς and τριακάς.

As in the case of the names of the months, the days are named and counted in the same way throughout the island of Rhodes and in the Peraea. In the list below there is some indication of the identity of nomenclature in different places, although there is no attempt to be exhaustive. The interpretation of the phrase ἐζ ἱκάδος is that it is backward count, relying on the demonstrated nature of the count in *IG* XII 1 4.

1. νευμηνία	*Inscr. Cam.* 148
2. δευτέρα	*SEG* III 674 B
3. τρίτα	*IG* XII 1 3
4. τετρὰς ἱσταμένου	*Inscr. Cam.* 156a
5. πέμπτα ἱσταμένου	*SEG* III 674 B
6. ἕκτα ἱσταμένου	*IG* XII 1 905 (Lindos); *Rhod. Per.* 39
7. ἑβδόμα ἱσταμένου	Blinkenberg, *Inscr. Lindos* 181
8. ὀγδόα ἱσταμένου	
9. ἐνάτα	*Inscr. Cam.* 151
10. δεκάτα	*Inscr. Cam.* 156
11. ἐνδεκάτα	*IG* XII 1 762 (Lindos); *Inscr. Cam.* 153
12. δωδεκάτα	*IG* XII 1 155; *Inscr. Lindos* 2 A (= *Syll.*^{3} 725)
13. τρίτα ἐπὶ δέκα	*Annuario* 33–34, p. 170 No. 20 (Lindos)
14. τετρὰς ἐπὶ δέκα	*IG* XII 1 892 (Lindos)
15. διχομηνία	*Inscr. Cam.* 148; *Rhod. Per.* 15
16. ἕκτα ἐπὶ δέκα	*Inscr. Cam.* 148
17. ἑβδόμα ἐπὶ δέκα	*SEG* III 674 A
18. ὀγδόα ἐπὶ δέκα	
19. ἐνάτα ἐπὶ δέκα	
20. ἱκάς	*Inscr. Cam.* 152; *Rhod. Per.* 39; *Lindos* II 680 (Ialysos)
21. ἀμφεικάς	*Rhod. Per.* 16
22. ἐνάτα ἐξ ἱκάδος	*IG* XII 1 906 (Lindos)
23. ὀγδόα ἐξ ἱκάδος	
24. ἑβδόμα ἐξ ἱκάδος	*IG* XII 1 890 (Lindos)
25. ἕκτα ἐξ ἱκάδος	*IG* XII 1 9
26. πέμπτα ἐξ ἱκάδος	
27. τετρὰς ἐξ ἱκάδος	
28. τρίτα ἐξ ἱκάδος	*SEG* III 674 B
29. προτριακάς, τριακάς	*IG* XII 1 4
30. τριακάς	*IG* XII 1 4, *Et. Thas.* V, p. 27, No. 172 (found on Thasos)

51. Nisyros

Δάλιος	*IG* XII 3 89
Καρνεῖος	*IG* XII 3 91.10; *ibid.* ἱκάς

52. Syme

The two months attested on this island are known at Rhodes, and the count of days is identical to that of the Rhodian calendar, significantly so in the appearance of διχομηνία.

ʼΑγρ[ια|νί]ο[υ] τετράδι ἐπὶ δέκα	*IG* XII 3 (Suppl.) 1269	II B.C.
Παναίμου [δ]ιχομηνίαι	*IG* XII 3 (Suppl.) 1270	II–I B.C.

53. Telos

ἐ]ν τῷ ʼΑγρια[νίῳ μηνὶ	*SEG* XII 715

54. Cnidos

Four months are attested:

ʼΑρτεμίτιος	LeBas-Wadd. No. 79
Βα]δρόμιος	Newton, *Halicarnassus, Cnidus, and Branchidae*, p. 758 No. 44
ʼΕλάφριος	*Tit. Calymn.* 79 B.33
ʽΥακίνθιος	*IG* XII 1 1418

55. Cos and Calymna

Most of our information about the Coan calendar comes from third century B.C. fasti of religious observance, which provided specific dates on which certain acts were to occur. The year as a whole was divided into two semesters, ἑζάμηνοι, *Inscr. Cos*, p. 403, it is clear, but the determination of the sequence of the months has not been so simple a matter.

Names and Order of the Months

Paton organized most of the information about the calendar in 1891,[1] differing considerably from the earlier treatment by Bischoff.[2] As Paton pointed out, the inscriptions themselves do not present enough information to make it possible to reconstruct the calendar, although some sequences could be determined. Paton drew upon analogies with the Rhodian list in order to reconstruct the calendar in use at Cos, placing Coan months in position according to the positions of the same named months at Rhodes[1]. The results were more or less accepted by Bischoff subsequently.[2]

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[1] W.R. Paton, L. Hicks, *The Inscriptions of Cos*, Oxford, 1891, Appendix B, "The Coan Calendar," pp. 327–334. The result was: (1) Alseios, (2) Theudaisios, (3) Petageitnyos, (4) Kaphisios, (5) Batromios, (6) Gerastios, (7) Artamitios, (8) Agrianios, (9) Hyakinthios, (10) Panamos, (11) Dalios, (12) Kameios, (13) Panamos B.

[2] *Leipz. Stud.* 1884, p. 381.

The system of analogy was challenged by Herzog in 1928,[3] and a completely new list was proposed, since Herzog felt that he was able to place ten of the months in the proper place in the list,[4] basing his arguments solely on the data, not on analogy. Since Herzog, apart from minor suggestions and adjustments to his list,[5] there has been no serious examination of the Coan calendar, although Herzog's list, despite its avoidance of analogy, was based on evidence which was and is susceptible of different interpretation. Herzog's argument worked with a series of sequences with few fixed points, and he constructed the list by interweaving the sequences in a plausible, but not necessary, pattern.

I do not know the evidence which disproves Herzog's thesis and establishes a new list, but a different order has been offered, without demonstration, and this list has been accepted by Bickerman.[6] In 1952 M. Segre's *Tituli Calymnii* appeared,[7] posthumously, and on p. 170 Segre set out his conclusions: "*Praeter annum, mensis quoque, quo manumissio acta est,* (speaking of Calymna) *commemoratur. Iidem sunt menses, quos Coi habuerunt; eorumque ordinem, quem R. Herzog e titulis tunc sibi notis constituerat…, e documentis nondum editis* (cfr. *Riv. di Filol.*, 1933, p. 371, n. 1), *quae proxime in lucem me proferre posse confido, ita definiendum esse puto:* χειμερινὰ ἑξάμηνος, 1. Καρνεῖος, 2. Θευδαίσιος, 3. Πεταγείτνυος, 4. Καφίσιος, 5. Βαδρόμιος, 6. Γεράστιος, Θερινὰ ἑξάμηνος, 7. Ἀρταμίτιος, 8. Ἀγριάνιος, 9. Ὑακίνθιος, 10. Πάναμος, 11. Δάλιος, 12. Ἀλσεῖος.

Segre was prevented from fulfilling his hope; I do not know the texts of which he wrote, and I have been unable to learn more of them. Evaluation of the position must therefore wait upon publication and further discussion of the calendar.

That the same basic list of months was in use at Calymna as at Cos has long been observed;[8] indeed the month Karneios was originally attested by a Calymnan text.[9] The appearance of the months Καῖσαρ, Τιβέριος in the manumissions from Calymna, while neither Γεράστιος nor Ἀρταμίτιος appeared, led Segre to conclude that these two honorific months supplanted the older two. Their order he was able to determine from *Tit. Calymn.* 167–170, which present a sequence with Tiberios preceding Kaisar. On the basis of this, Segre could conclude that in the period of Roman domination, at Calymna the same months as those of Cos remained in use, with the same order, except that Tiberios supplanted Gerastios, and Kaisar Artemitios.

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[1] *Op.cit.* 328–330.

[2] In *RE* s.v. Kalender, p. 1580. Bischoff seemed to accept Paton's placement and order of months 2–7.

[3] R. Herzog, *Heilige Gesetze von Kos, Abhandl. Berl. Akad.* 1928, 6, pp. 49–51.

[4] His list was: (1) Agrianios, (2) Karneios, (3) Artamitios, (4) Kaphisios, (5) Batromios, (6) Gerastios, (7) Hyakinthios, (8) Theudaisios, (9) Petageitnios, (10) Dalios, (11) Panamos, (12) Alseios. Herzog was dubious about the placement of Artamitios and Hyakinthios.

[5] M. Giffler, *Am. Journ. Arch.* 43, 1939, pp. 445–6, placed Artemitios in 7th position, on the analogy with Sparta and on the assumption that Artemitios was a rare month, and on the analogy with its position at Rhodes (drawing the analogy between the calendars on the basis of Paton's list, not Herzog's, which Giffler purported to accept in the main). This reasoning was attacked by W. K. Pritchett, *Am. Journ. Arch.* 50, 1946, pp. 358–360, for reasons which I think are valid.

[6] *Chronology* 1968, p. 21.

[7] In *Annuario della Scuola Archeologica d'Atene* 22, 1944/45 (publ. 1952).

[8] E.g., Bischoff, *Leipz. Stud.* 1884, repeated in *RE* s.v. *Kalender*, p. 1580.

[9] Cf. *Inscr. Cos*, p. 326 and Appendix H.

The Count of Days

The names of the days are amply attested in the religious fasti of Cos, and attestation for the following count is easily seen in *Inscr. Cos*, Index V, with supplements and corrections from Herzog, *Heilige Gesetze* (cited as *HG*) and G. Pugliese- Carratelli, *Annuario* 41/42, 1963/4 (publ. 1965), (cited as *PC*).

1. νευμηνία
2. δευτέρα (ἱσταμένου) cf. *HG* p. 51
3. τρίτα (ἱσταμένου)
4. τετρὰς (ἱσταμένου)
5. πέμπτα (ἱσταμένου)*
6. ἕκχτα (ἱσταμένου)*
7. ἑβδόμα (ἱσταμένου)
8. ὀγδόα (ἱσταμένου)*
9. ἐνάτα (ἱσταμένου)
10. δεκάτα
11. ἐνδεκάτα
12. δυωδεκάτα
13. τρισκαιδεκάτα*
14. τεσσαρεσκαιδεκάτα
15. διχομηνία
16. ἑκκαιδεκάτα
17. ἑπτακαιδεκάτα
18. ὀκτωκαιδεκάτα
19. ἐνάτα πρὸ ἰκάδος *HG* 4.5
20. ἰκάς, εἰκάς
21. ἀμφεικάς
22. ἐνάτα με[τ' ἰκ]άδα *HG* 1.57
    ἐνάτα ἐξ ἰκάδος *HG* 3.1
23. ὀγδόα ἐξ ἰκάδος *PC* 6b
24. ἑβδόμα ἀνομένου (ἀπιόντος, cf. 25)
25. ἕκχτα ἀνομένου; (ἀπιόντος, *PC* 6a)
26. πέμπτα ἀνομένου*; (ἀπιόντος, *PC* 6a)
27. τετρὰς ἀνομένου*; ἀπιόντος, *PC* 6a
    ἐξ εἰκάδος in *Inscr. Cos*
28. τρίτα ἀνομένου (ἀπιόντος, cf. *PC* 6a)
29. προτριακάς

29/30. τριακάς

* indicates days either unattested or attested only by numeral.

56. Halikarnassos

Although a fairly large number of months are attested at Halikarnassos, there is no indication in the texts themselves which would permit the establishment of any order. Those which Bischoff placed used analogy to other Ionian calendars exclusively, as Bischoff himself pointed out.[1] I prefer to list the months in alphabetical order.

Ἀνθεστηριών	Josephus, *Ant. Jud.* XIV, 10, 23 (256); *Anc. Gr. Inscr.* IV, 1, p. 55, No. 887; *BCH* 4, 1880, p. 395, No. 2
Ἀπολλωνιών	*BCH* 14, 1890, p. 106, No. 8
Ἀρτεμισιών	(*BCH* 5, 1881, p. 210, No. 5); *BCH* 14, 1890, p. 96, No. 3
Ἐλευθεριών	*BCH* 5, 1881, p. 212, No. 6
Ἑρμαιών	*Syll.*³ 45: πέμπτηι ἱσταμένο
Ἡρακλεῖος	*Anc. Gr. Inscr.* IV 1, p. 66, No. 895; *CIG* 2656: δωδεκάτῃ
Ποσιδεών	Newton, *Halicarnassos, Cnidos, and Branchidae*, 1863, p. 687

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[1] *RE* s.v. Kalender, p. 1586.

57. Iasos

At Iasos, in Caria, seven months are attested, but the months appear in a number of unrelated texts and there is no means of finding the sequence. Bischoff (*RE* s.v. Kalender, p. 1585) chose to present them only in alphabetical order, and I do the same:

ʽΑδωνιών	*JHS* 9, 1888, p. 342, No. 4
ʼΑληθιών	*REG* 6, 1893, p. 167, No. 4
ʼΑπατουριών	*Syll.*^{3} 169
ʼΑφροδισιών	*JHS* 9, 1888, p. 341, No. 2
Γη]φοριών	*CIG* 2679 (Originally read as Σκιρο]φοριῶνος. Gephorion proposed by Bischoff, *Leipz. Stud.* 1884, p. 397, note 15
ʼΕλαφηβολιών	*CIG* 2675
Ποσιδεών	*BCH* 13, 1889, p. 25, No. 1
Φυλλιών	*REG* 6, 1893, p. 172, No. 7

58. Miletus

The results of the study of the months set out by Rehm[1] in 1914 have not, to my knowledge, been challenged. Rehm's conclusion, assessing the earlier evidence as well as that of the Hellenistic period, was that the calendar, having begun the year with the autumnal equinox (i.e., with Boedromion) before the reign of Alexander, changed the New Year's date from autumn to spring equinox in the period between Alexander and 288 B.C., and perhaps more precisely, between 313 and 288 B.C. Subsequently, the year began with the month of Taureon. The conclusion was based[2] on a number of texts which show the order of the months and leave no division of the year possible between Taureon and Artemision.

In addition this constructed solution, other texts tend to support this conclusion. *Inschr. Milet* 3 147.58 shows an annuity which is to begin in Taureon, and it is reasonable to believe that the beginning month would be the first month of the business year. *Inschr. Didyma*[3] 389 may begin with the first month of the year, in this instance Taureon again; *Inschr. Didyma* 488.16–24 seems to enclose a business year within the months Taureon and Artemision, and Artemision, here several lines after Taureon, is probably in the same year as Taureon. Finally, the intercalary month appeared in *Inschr. Didyma* 485, and Rehm restored the text as [ʼΑρτεμι|σ]ιῶνος τοῦ ἐμβολίμ̣[ου concluding that if the restoration was correct, the last month of the year was the intercalary one. The argument from restoration is circular, of course, and I fear that we cannot consider the identification of the intercalary month as anywhere near certainty.

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[1] G. Kawerau, A. Rehm, *Das Delphinion in Milet*, Königliche Museen zu Berlin, *Milet, Ergebnisse der Ausgrabungen und Untersuchungen seit dem Jahre* 1899 III, Berlin 1914, pp. 230–240.

[2] *Op.cit.* p. 232.

[3] A. Rehm, *Didyma*, 2ter Teil, Die Inschriften, Deutsches Archäologisches Institut, Berlin, 1958.

Names and Order of the Months

The order of the months (beginning with the later first month, Taureon) follows. Attestation may be found in Rehm's discussion of 1914.[1]

1. Ταυρεών
2. Θαργηλιών
3. Καλαμχιών
4. Πάνημος
5. Μεταγειτνιών
6. Βοηδρομιών
7. Πυανοψιών = Magnesian Hagneon, *Inschr. Milet* 3 148.90ff.
8. Ἀπατουριών
9. Ποσειδεών
10. Ληναιών
11. Ἀνθεστηριών
12. Ἀρτεμισιών

The Count of Days

Although the individual count is not completely attested, there are enough days named in each part of the month to give a clear picture of the count and its terminology. The normal Greek pattern emerges: the first day is νουμηνία, *Inschr. Milet* 3 145.61, the first decad uses the term ἱσταμένου, e.g., πέμπτη ἱσταμένου, *Inschr. Milet* 3 145.78, ὀγδόη ἱσταμένου *Inschr. Milet* 3 147.11, although the modifier may be omitted, as ἕκτη in *Inschr. Didyma* 488.2. The second decad builds on δέκα, e.g., δωδεκάτη *Inschr. Milet* 3 31.3, τρίτη ἐπὶ δέκα, *Inschr. Didyma* 486, τετρὰς ἐπὶ δέκα *Inschr. Milet* 3 31.8, ἕκτη ἐπὶ δέκα, *Inschr. Milet* 3 148.90, while the last decad, beginning with εἰκάς, *Inschr. Milet* 3 143.26, uses the term ἀνομένου with numerals, e.g., ὀγδόη ἀνομένου in *Inschr. Milet* 3 145.29. Whether the count of the last decad was forward or backward we cannot tell.

The system set out below is attested for Hellenistic times, but the influence of Macedonian counting is attested in Roman times by *Inschr. Milet* 3 134.41, which shows the other count, although keeping the original Milesian months and not following the Asian Calendar (q.v.) promulgated in the decree of 9 B.C.

νουμηνία
δευτέρα (ἱσταμένου)
τρίτη (ἱσταμένου)
τετρὰς (ἱσταμένου)
πέμπτη (ἱσταμένου)
ἕκτη (ἱσταμένου)
ἑβδόμη (ἱσταμένου)
ὀγδόη (ἱσταμένου)
ἐνάτη (ἱσταμένου)
δεκάτη (ἱσταμένου)

ἐνδεκάτη
δωδεκάτη
τρίτη ἐπὶ δέκα
τετρὰς ἐπὶ δέκα
πέμπτη ἐπὶ δέκα
ἕκτη ἐπὶ δέκα
ἑβδόμη ἐπὶ δέκα
ὀγδόη ἐπὶ δέκα
ἐνάτη ἐπὶ δέκα
εἰκάς

⇅

ἐνάτη ἀνομένου
ὀγδόη ἀνομένου
ἑβδόμη ἀνομένου
ἕκτη ἀνομένου
πέμπτη ἀνομένου
τετρὰς ἀνομένου
τρίτη ἀνομένου
δευτέρα ἀνομένου
τριακάς

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[1] *Op.cit.*, and index, p. 440. Also in *Inschr. Didyma*, Taureon, 47; 389; 488.16; Thargelion, 39; Boedromion, 418; Lenaion, 488.2, 9; Artemision, 488.23; 486.

Calendars of the Colonies of Miletus

Miletus	*Cyzicus*		*Olbia*	
Taureon	Ταυρεών	*CIG* 3657.13 *CIG* 3658		
Thargelion	Θαργηλιών	*Ath. Mitt.* 6, 1881, p. 42, No. 1	Θα[ργηλιών]	*Inscr. Pont. Eux.* I^2, 44
Kalamaion	Καλαμαιών	*CIG* 3663 A	Καλαμαι[ών]	*Ibid.* 49
Panemos	Πάνημος	*CIG* 3663 A	Πάνημος	*Ibid.* 39
Metageitnion			[Μεταγειτ]νιών	*Ibid.* 35
Boedromion			Βοηδρομιών	*Ibid.* 40
Pyanopsion	Κυανεψιών	*CIG* 3662	Κυανεψιών	*Ibid.* 43
Apatoureon	Ἀπατουρεών	*CIG* 3661	[Ἀπα]τουρεών	*Ibid.* 47
Posideon	Ποσειδεών	*Ath. Mitt.* 16, 1891, p. 438; *CIG* 3664		
Lenaion	Ληναιών	*Ibid.*	Ληνεών	*Ibid.* 45
Anthesterion	Ἀνθεστηριών	*Ibid.*	Ἀνθεστηρ[ιών]	*Ibid.* 33
Artemision	Ἀρτεμισιών	*CIG* 3657		

Miletus	*Sinope*		*Apollonia in Mysia, Apollonia Pontica, Istros, Cius,*[1] *Leros, Odessos, Patmos, Tomis, Tyras*
Taureon	Ταυρεών	*Syll.*^{3} 1017	
Thargelion			Thargelion, Istros, Bilabel, p. 71; very doubtful
Kalamaion			
Panemos	[Π]άνη[μος]	*Am. Journ. Arch.* 9, 1905, p. 313, No. 40	
Metageitnion			Μεταγειτνιών Leros, *Annuario* 41–42, Manganaro No. 2 (= *BCH* 19, 1895, pp. 550–551)
Boedromion			
Pyanopsion			
Apatoureon	Apatoureon	Bilabel, p. 71, n. 39 (vase inscriptions)	Apatoureon, Odessos, Istros, Bilabel, p. 71; [Ἀπατου]ρεών Tomis, *Arch. Epigr. Mitt.* 6, 1882, p. 8, No. 14[2]
Posideon	Ποσιδεών	*Syll.*^{3} 1017	
Lenaion	Lenaion	Bilabel, p. 71, n. 39 (vase inscriptions)	Λεναιών Cius, Le Bas-Wadd. III 1140; Λενεών Tyras, *CIL* III 781
Anthesterion	Anthesterion	*Ibid.*	Ἀνθεστηριών Apollonia in Mysia, Le Bas-Wadd. III 1076; Cius, *CIG* 3723; Anthesterion, Apollonia Pontica, Odessos, Bilabel, p. 71
Artemision			Ἀρτεμισιών Istros, *Arch. Epigr. Mitt.* 6, 1882, p. 36, No. 78.1; Odessos, *CIG* 2056 (cf. Bilabel, p. 146); Patmos, *Syll.*^{3} 1068; Tyras, *Inscr. Pont. Eux.* I^{2}, 2.21

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[1] In addition to these Milesian months, there are attested at Cius three months, Heraios, Dionysios, Herakleios, *BCH* 15, 1891, pp. 481ff., from the Bithynian calendar (q.v.). Cf. Bischoff, *RE* s.v. Kalender, p. 1586, and Bilabel, p. 44.

[2] The text, attributed to Callatis, has been argued for Tomis by Bilabel, pp. 17–18.

The Colonies of Miletus

Bilabel's presentation of the lists of months in the Milesian colonies, although dubious in details,[1] shows clearly that the list attested at Miletus shows up consistently in the colonies. Cities like Olbia and Cyzicus, where almost all the months are attested, have no variance from the months in the Milesian list. It is probably safe to accept the conclusion that in these cities, if not in many other of the cities of Milesian colonial origin, the mother-city's calendar was adopted *in toto.*

In the list which precedes, I have printed in Latin characters the names of months which are not directly attested at a given place, but for which there may be evidence which would justify the inclusion on bases other than pure analogy to the Milesian list.

The evidence for the count of days is so scattered that it is difficult to make a clear determination of the relation with the home city. Similar to Miletus is the δεκάτη ἱσταμένου of *Syll.*^{3} 708, and as Miletus may use the number alone, so too may be the πέμπτη of *CIG* 3657, and possibly even the η of *CIL* III 781, although the late character of this text makes this doubtful.[2] Similar also to the Milesian practice is δωδεκάτη of *Syll.*^{3} 1017, although the τεσσαρεσκαιδεκάτη in the same text is different. Although an εἰκάς appears in *Annuario* 41–42, Manganaro No. 2, the other items of evidence for the last decad, τρίτη ἀπιόντος in *CIG* 3658, and τετρὰς φθίνοντος in 3657 are different from each other and from Miletus as well. It is probable that there was no consistency in practice.

59. Priene

Priene, neighbor to Miletus and of similar ethnic background, seems to have had a calendar identical or very similar to that of Miletus. All but two of the Milesian month-names are attested at Priene,[3] and such testimony as can be adduced suggests the same order as the Milesian months. *Inschr. Priene* 174.20 seems to indicate that Lenaion preceded Anthesterion; *Inschr. Priene* 3.18 points to the sequence Boedromion-Pyanopsion; both *Inschr. Priene* 4 and 21 are dated in Metageitmion and refer forward to Boedromion as in the next year, indicating both the sequence of the two months and the placement of New Year's between them, so that Boedromion seems to have begun the year at Priene, as it did in the earlier state of the Milesian calendar.

Posideon and Kalamaion are not attested. In dealing with the question of the calendar at Priene, the editor of *Inschr. Priene* suggests[4] the inclusion of Posideon in the same position which it occupied at Miletus, but offers a different sequence for the last three months of the Priene calendar. Month 11, Panemos at Miletus, is the source of difficulty. In *Inschr. Magn.* 1 the month name ʽΑ]γνηιῶν[ος] appears, and the formulae of this much damaged stone, resembling as they do the formulae of *Inschr. Priene* 3, may be taken to indicate a Prienean origin for the text. Were this the case, we should include the month Hagneon in the list for Priene. On the other hand, this month is well attested at Magnesia,[1] and never in texts which are definitely of Prienean origin. The analogies between the very fragmentary text from Magnesia and *Inschr. Priene* 3, while striking, do not seem to me to require that that text of *Inschr. Magn.* 1 originated from Priene.

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[1] F. Bilabel, *Die ionische Kolonisation, Philologus* Suppl. 14, 1, 1920, pp. 67–80.

[2] It is worth noting that in this text, dating to A.D. 201, Lenaion 8 = *a.d. XIII Kal. Mart.*

[3] Hiller von Gaertringen, *Inschriften von Priene*, Königliche Museen zu Berlin, Berlin, 1906, p. 256.

[4] *Ibid.*

This would eliminate one candidate for the Priene list. The other candidate comes from *Inschr. Priene* 111.202: ψηφίσματα τε γράψας ἐπὶ ʼΑκρισίου κρο. On analogy to line 212 of the same inscription, ἐπὶ Μεγαρίστου Ταυρεῶνος ΑΣ̣μοπ̣οι̣(?)..ν[Hiller suggests in a note to line 202: "Wenn ein Monatsname übrig wäre, was nicht der Fall zu sein scheint, würde man hier Κρο[νι|ῶνος] ergänzen." I am inclined to reject Kronion as a possible month in the calendar of Priene. The reading of the whole column is, in the words of the editor, "sehr unsicher," one does not expect a month in this position, and the analogy is in any case peculiar, fragmentary, and unclear. Only the three letters κρο appear, so that restoration is required in any case.

If both these candidates are eliminated, then 11th place is open and we must note the striking parallels between the calendars of Miletus and Priene: 10 months at Priene have the same names as 10 at Miletus; two groups of two months are in the same relative positions in both calendars; the beginning of the year at Priene is the same as in the (earlier) Milesian arrangement. With so many similarities between the calendars of these two neighboring cities, it is reasonable to assume that the remaining two months were the same, and thus we could include Kalamaion at Priene. We would place Posideon in 4th place as did Hiller, Kalamaion would be 10, Panemos 11,[2] so that we would have the same list as that of Miletus.

The Count of Days

The days attested are listed in *Inschr. Priene*, p. 256, and seems to be the same as that of Miletus, with minor terminological variants: as at Miletus, in the first decad ἱσταμένου is sometimes used, sometimes omitted; instead of τετρὰς ἐπὶ δέκα etc., we find τεσσαρεσκαιδεκάτη, ἑκκαιδεκάτη; the last decad is identified by the use of ἀπιόντος instead of ἀνομένου; the term διχομηνία appears.

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[1] Cf. *Inschr. Magn.* p. 217.

[2] *Inschr. Priene* p. 256 displaces Panemos to 10th place for the sole reason, so far as I can see, that Kronion, if it were in the list, would be placed in 11th place on the view that it was the old name of the Attic Hekatombaion, the month which preceded Metageitnion in the Athenian calendar. That kind of analogy is certainly dangerous and not at all reliable. I should note here, in passing, that I am not entirely confident about relying upon the Milesian analogies in reconstructing the calendar of Priene, although the large number of similarities and closeness of places encourage me in applying analogy here. If, however, the names of either of the months which I exclude here should in fact be included in the Priene list, the force of the argument from similarity is weakened and the validity of the analogy seriously undercut.

60. *Herakleia under Latmos*

Three months are attested, Γαμηλιών = Taureon at Miletus, *Inschr. Milet* 3 150.27, Ἀπατουριών = Apatourion at Amyzon, *Inschr. Priene* 51, and Θεσμοφοριών, *Inschr. Milet* 3 150.55.

61. *Amyzon*

Inschr. Priene 51 shows Ἀπατουριών = Apatourion at Herakleia under Latmos.

62. *Thebes at Mykale*

The three months attested by *Inschr. Priene* 362, Πυανοψιών, Ταυρεών, Ταργηλιών, are probably Milesian, as Wiegand, *Inschr. Milet* 3 p. 236, suggests, on the grounds that Mykalian Thebes was under control of Miletus when the text was carved.

63. *Samos*

Names and Order of the Months

Partly on the basis of a list of gymnasium victories, Michel 899, Bilabel in 1920 presented a list of Samian months[1] which was subsequently accepted by Preuner.[2] Two months were unattested at Samos, and Bilabel placed Thargelion and Kalamaion in the list on analogy to the names and positions of these months in the Milesian list. This list required the excision of the Metageitnion which appears in *GDI* 5699 (cf. A. Wilhelm, *Wien. Stud.* 29, 1907, 9), and Preuner followed Bilabel in this, not accepting Bilabel's view that the Metageitnion derived from the Attic cleruchy, but because he thought the inscription was non-Samian. However, in 1957 Habicht published a Samian inscription which contained Metageitnion,[3] showing that the month was to be included in the Samian list.[4]

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[1] F. Bilabel, *Die ionische Kolonisation, Philologus* Suppl. 14, 1, 1920, pp. 159–163 and 166: Pelysion, Kyanopsion, Apaturion, Posideon, Lenaion, Anthesterion, Artemision, Taureon (Thargelion?), (Kalamaion), Panemos, Kronion.

[2] *Ath. Mitt.* 49, 1924, pp. 41–42.

[3] *Ath. Mitt.* 72, 1957, p. 214. On p. 215, n. 63, Habicht argues the presence of Metageitnion in the Samian calendar, giving a resume of the studies of the pertinent inscription.

[4] L. Robert, *Hellenica* 11–12, 1960, pp. 207–209, has defended the Samian nature of *GDI* 5699.

Bischoff has accepted Metageitnion into his list,[1] but differed in other details from Bilabel. I do not think that the months which are unattested as to order are certain in any list, and so list those in alphabetical order after that group the sequence of which is attested by Michel 899. I omit Thargelion, although Habicht has suggested that the personal name Ταργήλιος supports it.[2]

Πελυσιών	*Hermes* 39, 1904, p. 606, line 56, indicates Pelysion as the first month, and *ibid.* p. 604, line 2, Kronion as the last
Κυανοψιών	
Ἀπατουριών	
Ποσιδεών	
Ἀνθεστηριών	Michel 899
Ταυρεών	
Πάνημος	
Κρονιών	

followed by: Ἐμβολίμου, Ἐμβολίμου τρίτου, Ἐμβολίμου τετάρτου

Ἀρτεμισιών	*Hermes* 39, 1904, p. 605, line 37
Ληναιών	*BCH* 5, 1881, p. 479, No. 3
Μεταγειτνιών	*Ath. Mitt.* 72, 1957, p. 214

The Count of Days

There is little attested for the count of days, but the dates of Ληναιῶνος ζ in *BCH* 5, 1881, p. 479, No. 3, Πελυσιῶνος ιζ' in *Hellenica* 11–12, 1960, p. 206 (with plate) = *SEG* IV 207, taken with the Ποσιδεῶνος πέμπτηι ἀπιόντος in *Hellenica* 11–12, 1960, p. 205, and ἕκτηι ἀπιόντος in *Inschr. Priene* 42 suggest that the count was continuous through the first two-thirds of the month, but that the last decad was counted separately.

64. Magnesia on the Maeander

Although all 12 months are attested among the inscriptions from Magnesia, I am not confident about the establishment of an order for them. Kern, in publishing the texts merely listed the months in alphabetical order[3] and I present that list only,[4] rather than follow the list which Bischoff arrived at in his reasoning from analogy:[5]

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[1] *RE* s.v. Kalender, p. 1585: 1, Pelysion; 2, Metageitnion; 4, Kyanopsion; 5, Apaturion; 6, Posideon; 7, Lenaion; 8, Anthesterion; 9, Artemision; 10, Taureon; 11, Panemos; 12, Kronion.

[2] *Op.cit.* p. 215.

[3] O. Kern, *Die Inschriften von Magnesia am Maeander*, Königliche Museen zu Berlin, Berlin, 1900, Index III, p. 217.

[4] I omit Klareon (as did Bischoff, see note 5) which appears in *Inschr. Magn.* 114.6. The text is not Magnesian; cf. Hiller, *Berliner Philologische Wochenschrift*, 1915, p. 243.

[5] *RE* s.v. Kalender, p. 1586: (1?) Kronion, (2) Hagnion, (3?) Smision, (4) Posideon, (5) Lenaion, (6) Anthesterion, (7) Artemision, (8?) Kureon, (9?) Genesion, (10) Leukathion, (11) Palleion, (12) Heraion.

ʽΑγνιῶν, ʼΑνθεστηριών, ʼΑρτεμισιών, Γενεσιών, ʽΗραιών, Κουρεών, Κρονιών, Λευκαθεών, Ληναιών, Παλλεών, Ποσιδεών, Σμισιών.

The Magnesian month Hagnion is equated to the Milesian Pyanepsion in *Inschr. Milet* 3 148.91. It is worth noting that there is no indication among the texts of any intrusion into or change in the list of Magnesian months. The same group of months appear in texts ranging from early Hellenistic (e.g., Koureon, Artemision, Lenaion, in *Inschr. Magn.* 4, 5, 13) to Roman imperial (e.g., the same months in *Inschr. Magn.* 113, 179, 117 respectively). The absence from the texts of the months promulgated by the order of 9 B.C. setting up a calender for the Asian cities (p. 181) shows that the Magnesians preserved their calendar against the change.[1]

The Count of Days

The evidence suggests some shift in terminology with the progress of time. As in most cities in Asia Minor, Magnesia in the earliest texts shows a count which proceeded uninterruptedly through the first two thirds of the month, to resume with a count ἀπιόντος for the last decad. This is shown by the following items; all citations from *Inschr. Magn.*: νουμηνία 14.3, 98.15, δευτέρη νουμηνίη 6.2, δευτέρη ἱσταμένου 4.4, δευτέρα 100 b.29, 101.5, πέμπτη 13.2, ἕκτη ἱσταμένου 100 a.6 etc., δωδεκάτη 98.34, διχομηνίη 2.3, ἑπτακαιδεκάτη 9.2, δεκάτη ἀπιόντος 5.2, τετρὰς ἀπιόντος 89.8, 90.4, 98.4.[2]

By the appearance of ξ̄ ἱσταμένου in 105.2, we see the development towards the use of numerals, but preserving the divisions of the month. Numerals become more common with the passage of time, into the imperial period, δʹ 114.6, ιηʹ 116.3 and the appearance of θκʹ in 179.39 may indicate the complete abandonment of the decadal system in imperial times. Such may also be the meaning also of τριακάς in 116.23. The Roman Σεβαστή appears in 113.2, obviously an influence from neighboring calendars.

65. Ephesus

In 1890, Hicks drew up a list of Ephesian months, aligning them with both the Athenian months and with the modern calendar.[3] The equations he made depended upon analogy with the Athenian list in large measure, although he had an actual equation of Anthesterion 2 = *a.d. VIII Kal. Mart.* in *Anc. Gr. Inscr.* III 481 (= *Inschr.*

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[1] For similar examples of calendars which did not change after the reform of 9 B.C., cf. Miletus, Ephesus. D. Magie, *Roman Rule in Asia Minor* II, 1950, p. 1343, has noted the phenomenon.

[2] The terminology πέμπτη ἐπὶ δέκα in *Inschr. Milet* 3 148 is probably not properly Magnesian, but is rather influenced by Milesion expression.

[3] *Anc. Gr. Inscr.* III, part 2, pp. 78–79.

Ephes. II 27) which fixed Anthesterion to February–March because of close parallels to Miletus. Hicks' list, admitted by him to be a conjecture, was more or less accepted by Bischoff,[1] with the addition of months which had come to light after the earlier publication, and Bischoff accepted the equations to the Attic calendar as well.

Names and Order of the Months

Hicks had concluded that the year began at Ephesus on 24 September[2] and Bischoff accepted Hick's beginning of the year, as it came at the same time as New Year at Miletus.[3] Although we do not have any texts which present the months in sequence, to confirm these judgements, various items argue for the acceptance of this Hicks-Bischoff hypothesis. The hemerologia (q.v.) present a list of months of Macedonian type for Ephesus, with the year beginning on 24 September; although this list is in fact the calendar of Asia introduced in 9 B.C, the list may indicate the beginning of the year at Ephesus in Roman times, even if the month names are not correct. The calendar equation Anthesterion 2 = *a.d. VIII Kal. Mart.* is even better evidence, when taken with the equation Taureon = Daisios in *Inschr. Perg.* 268: in the scheme elucidated by Bischoff, Taureon (= Daisios) comes two months after Anthesterion, which aligned to the Macedonian calendar, would then fall together with Xanthikos. In the Asian calendar, Xanthikos began on 21 February, precisely the date on which Anthesterion began according to the equation in the Ephesian text. The precise equation in the text of *Inschr. Perg.* 268 Ταυρεῶνος τετράδος ἀπιόντος — Δαισίου τετράδος ἀπιόντος, the accord with the Asian calendar in the Ephesian text, and the Roman honorific month Neokaisareon in Le Bas – Wadd. 1537 all coalesce to indicate that the older Ephesian names survived into the imperial period, but that the calendar was assimilated to the julian on the same basis as the calendar promulgated for Asia in 9 B.C. All this is proved by the specific statement of this in *Anc. Gr. Inscr.* III 482 B.17ff., which relates the Ephesian (spelling) to that of the calendar of Asia: μῆνα καλούμενον παρ' ἡμῖν μὲν 'Αρτεμισιῶνα παρὰ δὲ Μακεδόσιν καὶ τοῖς λοιποῖς ἔθνεσιν τοῖς Ἑλληνικοῖς καὶ ταῖς ἐν αὐτοῖς πόλεσιν 'Αρτεμίσιον.[4] In the list below, I align the Ephesian list as set out by Bischoff to the months of the calendar of Asia, but warn that this equation could only be valid for the imperial period. For julian equivalents, see above.

Kaisar	Νεοκαισαρέων	*Anc. Gr. Inscr.* III 601 d
Apellaios	Ἁγναιών	Le Bas – Wadd. 1537
Audnaios	Μαιμακτηριών	*Anc. Gr. Inscr.* III 601 h
Peritios	Ποσιδεών	*Inschr. Ephes.* II 27
Dystros	Ληναιών	*Anc. Gr. Inscr.* III 477 Col. E
Xandikos	'Ανθεστηριών	*Inschr. Ephes.* 27

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[1] *RE* s.v. Kalender, pp. 1584 and 1593.

[2] *Op.cit.*, based on the argument of Marquardt, *Handbuch der römischen Altertümer* IV, p. 177.

[3] *Op.cit.* p. 1584.

[4] Already deduced by Dessau, Hermes 35, 1900, pp. 332–338; see below, p. 176.

Artemision	ʼΑρτεμισιών	*Anc. Gr. Inscr.* III 482 B. 17
Daisios	Ταυρεών	*Inschr. Perg.* 268
Panemos	Θαργηλιών	*Inschr. Ephes.* II 27
Loos Gorpiaios	Κλαρεών	Keil-Premerstein, *Denkschr. Akad. Wien* 57, 1, 1914, p. 109; Keil, *Öst. Jahreshefte* 15, 1912, Beibl. p. 207; cf. Hiller, *Berl. Philol. Wochenschr.* 1915, p. 243
Hyperberetaios	Μεταγειτνιών	*Inschr. Ephes.* II 18

The Count of Days

The very limited evidence does not permit us to draw any conclusions about the nature of the count; indeed, what evidence there is suggests that many styles of count were in use. The use of decadal count is attested for the beginning of the month with the appearance of ἕκτη ἱσταμένου in *Inschr. Ephes.* II 27.69,225, and also in line 3, with a numeral, ϛ ἱσταμένου. If *Inschr. Perg.* 268 is presenting the count in Ephesian terminology, we have decadal count at the end of the month with τετρὰς ἀπιόντος. Ordinary numeral count appears in *Inschr. Ephes.* II 18, ιβ, and the day written out, in *Inschr. Ephes.* II 27.226. In the same text, line 450, we find a numeral but the day specially designated: β Σεβαστῇ.

66. Notion

I know of only three months at Notion: ʼΑρτεμισιών with the day λ in *Öst. Jahreshefte* 15, 1912, p. 53. No. 25; Κρονιών in *Öst. Jahreshefte* 8, 1905, p. 163, line 11; Ληναιών with the day ὀκτωκαιδεκάτη in *BCH* 37, 1913, p. 241, No. 48.

67. Teos

The month Ποσιδηϊών is attested, Anacreon apud Eust. ad *Iliad* XV, 192.

68. Chios

Only five months are attested at Chios, and no attempt has been made to determine their order.

ʼΑρτεμισιών	*SEG* XXII 508.19
Βαδρομιών	*SEG* XXII 508.53
Λευκαθεών	*SEG* XXII 508.25
Πλυντηριών	*Syll.*^{3} 987.10
Ποσιδεών	*Syll.*^{3} 987.23

A few days are attested: τετράς, *Syll.*^{3} 987.11; δεκάτη, *SEG* XXII 508.53; ἑπ[τακαι]δεκάτη, *SEG* XXII 508.25; τετάρτη ἐξ εἰκάδος, *Syll.*^{3} 987.23. These suggest a continuous count through the first two decads of the month, with a separate count for the last decad.

69. Erythrae

Attestation of the months is very limited. The three months Ποσιδεών, Ληναιών, and ’Ανθεστηριών appear in *Mouseiou kai Bibliothekes tes euangelikes scholes* 1, 1873–1875, p. 103, No. 108 = *Rev. arch.* 33, 1877, pp. 109–119. ’Αρτεμισίων appears in *BCH* 3, 1879, p. 390 = *Mouseiou* etc. 3, 1878–1880, p. 122, No. 156. Πάνημος appears in *Anc. Gr. Inscr.* III 1, p. 33, No. 418.

70. Phocaea

Three months are attested, in sequence, if not necessarily following upon each other directly, in *Inschr. Priene* 64, ca. 190 B.C.: Μαιμακτήρ, ’Αρτεμισιών, ‘Ηραιών.

71. Temnos

Inschr. Perg. 5 shows the month of ’Εράος at Temnos as equivalent to ’Εράος at Pergamon.

72. Cyme

Four months attested:

’Αμαλώιος	*BCH* 12, 1888, p. 363, No. 6
Πορνόπιος	*Öst. Jahreshefte* 14, 1911 Beibl. p. 136; cf. the remark of Strabo, XIII, 64 (613) that a month is called Pornopion by the Aeolians in Asia
Τερφεύς	*BCH* 12, 1888, p. 361, No. 4
Φράτριος	*CIG* 3524

73. Pergamum

There are many months attested at Pergamum, but the evidence does not make it possible to sort out those which belonged to an individual Pergamene calendar from those attested at Pergamum but attributable to users of the Macedonian calendar. Furthermore, there is evidence for the introduction of two honorific months, but it is not possible to determine the date of the introduction of either of these, or the duration of use of either. Fränkel separated the attested months into two groups[1] listing first Ἀπολλώνιος, Δάλιος, Εὐμένειος, Ἥραος, Θ(αργηλιών), Πάνθειος Ῥω(μαῖος?), Φι(λεταίρειος), Φράτριος in alphabetical order, following these by Δίος, Ἀπελλαῖος, Αὐδναῖος, Περίτιος, Πάνημος, Λῷος, Γορπιαῖος, Ὑπερβερεταῖος, i.e., Macedonian months in their order in the Macedonian calendar, followed at the end by the attestation of the Roman Καίσαρος, Καισάριος. He treated the first group as Aiolian, and set forth parallels in the discussion of *Inschr. Perg.* 247,[1] without discussing the months of Eumeneios, Philetaireios, and Romaios? in any detail. These three, if they are correctly interpreted, seem to be peculiarly Pergamene, and would seem to suggest a Pergamene enthusiasm for honorific months.[2]

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[1] Max Fränkel, *Die Inschriften von Pergamon* 2, Berlin, 1895, pp. 531–532.

This apparently neat division is not supported by the evidence. Although the Roman Kaisareios, with the Macedonian Peritios, Panemos, Loios, and Hyperberetaios, months set out in the new Asian calendar by the order *Inschr. Priene* 105 (= *OGI* 458), appear in *Inschr. Perg.* 374 of the time of Hadrian, and Gorpiaios appears in *Inschr. Perg.* 278, also of Roman date, of the first century of our era, some of the Macedonian months are attested also prior to the Roman period. For example, Panemos appears along with Phratrios and Apollonios in *Inschr. Perg.* 247, the Hellenistic festival calendar. In addition, before the acquisition of Pergamum by Rome are attested Audnaios and Dios in *Inschr. Perg.* 248, in dates of 142/1 and 135/4 respectively; on the seal stamps of the regnal period appear Panemos, Peritios, Dalios, Dios, A ( ), Phi(letaireios) Th(argelion) and Ro(maios). Bischoff seems to have ignored the testimony of the stamps in creating his list,[3] which comprises Eraos, Phratrios, Panemos, Apollonios, Audnaios, Dios, Eumeneios, and Pantheios.

I do no know how these matters can be resolved. While it might be possible to consider the "Macedonian" months attested on texts other than the stamps as belonging to a Pergamene calendar, it does not seem to me possible to set the months of the stamps aside as belonging to a separate calendar: it is not purely of Macedonian type, as the appearance of Dalios shows, supported by the honorific months and the month beginning with *theta*. The appearance of some Macedonian months cannot be attributed solely to the Macedonian military colony,[4] as the Macedonian months seem generally attested as much as any others. My own guess is that there were changes in the Pergamene calendar month names during the period of the kings, changes probably brought about by the introduction of the honorific months, if not at other times as well, and this could explain the plethora (at least 13) of month names attested in the Hellenistic period. An example of this might be, e.g., the substitution for Eraos, *Inschr. Perg.* 5, of one of the honorific months, and the wholesale introduction of the new Asian calendar in 9 B.C. The modification of the Pergamene calendar may have been extensive, or not, and there may have been changes on more than one occasion. The evidence is too limited to permit me to offer this theory as more than a hypothesis, and certainly too limited to permit any demonstration of when such changes might have occurred. Indeed, it may well be that we do not have all the months which might have been in use at Pergamum during the royal period.

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[1] *Ibid*, 1, pp. 162–164, discussing months named in a Hellenistic festival calender.

[2] The three are discussed by Kenneth Scott, "Greek and Roman Honorific Months," *Yale Class. Stud.* 2, 1931, pp. 202–206. Neither Philetaireios nor Romaios are attested in full, since they only appear on the dated seal stamps from Pergamum. If they are interpreted correctly, Pergamum has a surprisingly high number of honorific months. But even the appearance of the one certain honorific month, Eumeneios, is unusual, as the practice of naming months in this way was not common in the Hellenistic period.

[3] *RE* s.v. Kalender, p. 5177.

[4] Cf. Fränkel, *Inschr. Perg.* 1, p. 164.

The Count of Days

The evidence for the individual count,[1] although sparse, shows that the month was divided into three decads at Pergamum as at so many other cities. The count went forward to ἐικάς, and the last decad was designated by ἀπιόντος, at least before the Roman period. The use of numerals is attested both in the period of the kings and in the Roman period, and λ is found in *Inschr. Perg.* 274 C.10, of the period of Hadrian, suggesting that by the end of the first century the count might have shifted to a consecutive count through the whole month. In the same text Σεβαστή appears (B.4,8 D.10) for the first day of the month, and there as in other texts of the Roman period appear strictly Roman calendar dates.

74. Lesbos

The very limited evidence which may with confidence be brought to bear on the calendar of the cities of Lesbos has been taken to show that a single common system was in use on the island. Pantheios is used at Mytilene (*IG* XII 2 81) and at Methymna (*IG* XII Suppl. 116); in *IG* XII Suppl. 138, a decree of Mytilene in honor of the Magnesians, the date of election (Terpheios?[2] 18) is given, and the text states that Methymna and Antissa voted the same. Bischoff (*Leipz. Stud.* 1884, p. 350) took the treaty later published as *IG* XII Suppl. 136 to indicate a common calendar on the island. Yet that text, if the restorations as published be correct, would suggest some difference: the Theodaisios of Mytilene (l. 2) is equated to Daisios at Eresos (l. 4).[3] It might be possible to salvage a common calendar by taking this evidence to indicate a discord between two calendars with common names and orders of the months. With the difficulties, Paton was cautious, listing the names of months occurring at various cities separately (*IG* XII 2 index p. 154) while Hiller was more willing to accept Bischoff's view of community of calendars (*IG* XII Suppl. p. 17).

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[1] Attestation for individual days may be found in *Inschr. Perg.* 2, Index, p. 532.

[2] Kern's reading, 'Ο]ρφείωι, *Inschr. Magn.* 52, was followed by Bischoff, *RE* s.v. Kalender, p. 1577.

[3] Bischoff, *Leipz. Stud.* 1884, p. 350, did not wish to read Daisios. However, there may be some support for the reading, as the Θεο]δαισίω read by Paton in *IG* XII 2 81 is seen as ἄρχει] Δ̣αισίω by Hiller in *IG* XII Suppl. p. 14.

The difficulties of the calendars of Lesbos are compounded by serious doubt of the applicability of a major item of evidence. The inscription now known as *IG* XII Suppl. 29 contains the names of four months; the provenience of the stone is uncertain, and it is only after much discussion that Hiller (*IG* XII Suppl. p. 17) confidently assigned it to Mytilene.[1] Although the evidence of prosopography is very tempting, the dialect and orthography of the stone would seem to argue against a Lesbian origin.[2] The genitives end in ου instead of the Aeolic orthography ω and we have *eta* in feminine genitives. The first day of the month appears as νουμηνία in line 2, instead of the νεαμέρα most common on Lesbos, or even νεομηνία in *IG* XII 2 69a or 646b. Thus the months cannot confidently be assigned to Lesbos.

Names and Order of the Months

Since Hiller was willing to accept *IG* XII Suppl. 29 as evidence for the Lesbian calendar he was able to propose a list of months. The state of our knowledge will be clearest by using that list as a basis, with the preliminary acknowledgement that Hiller's order is based on analogy with the month names in other calendars, and is thus not very sure.

1. Θεοδαίσιος	Attested at Mytilene, ca. 200–167 B.C. *IG* XII Suppl. 136
2. Δῖος	In *IG* XII Suppl. 29 as Δείου. Possibly attested in *IG* XII 2 502: μῆνος τῶ Διο[
3. Ἀγερράνιος	Attested at Eresos in *IG* XII 2 527
4. Κορύδιος	Attested at Mytilene in *IG* XII 2 81
5. Ὁμολώιος	Attested at Eresos in *IG* XII 2 527
6. Ἰουλαῖος	*IG* XII Suppl. 29. Hermann, *Monatskunde* p. 14 and 64, grouping this with Ἰουλίηος at Aphrodisias and Ἰούλιος on Cyprus, considered "*alle drei unter römischem Einflusse entstanden,*" but Hiller considered this wrong; he drew analogies to: the name of Demeter Ἰουλώ drawn from grain-sheaves (ἴουλοι) attested by Semos of Delos ap. Ath. XIV, 618d. One might also note the Delphian Ἰλαῖος. However, in the absence of any attestation of a month Ἰουλαῖος prior to the Roman influence, probability rests with Hermann's interpretation. This is particularly so since the evidence of non Aeolic dialect forms suggests that the stone is late (if Lesbian at all). Thus, even if accepted as Mytilenaean, we should accept the evidence of the months as those of a calendar somewhat different from that of earlier Mytilene.
7. Ἀπελλαῖος	Not attested on Lesbos
8. Τερφεύς	Mytilene, but restored. *IG* XII Suppl. 138: Τε]ρφείωι first read as Ὀ]ρφείωι, *Inschr. Magn.* 52

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[1] Thus approving the reasoning of Curtius, that, on the basis of the appearance of οἱ Κλεανακτίδου in the sepulchral inscription on the stone, the whole stone is tied to Lesbos through the references to that name there: Strabo XIII, 2, 3 mentions τοῖς Κλεανακτίδαις among those whom Alcaeus reproached; Demosthenes L, 56, mentions a Kleonax of Tenedos; Hippocrates, *Epid.* I, 698 mentions a Kleanaktides. Hermann, *Monatskunde* p. 14, assigned "*keine bestimmte Stelle*" to the months of this stone, because of the "*Ungewißheit des Fundorts.*" Bischoff was dubious (*Leipz. Stud.* 1884, p. 349) and Paton (*IG* XII 3 index p. 154) excluded the months from Lesbos.

[2] Unless the stone is very late, see below.

9. Πάνθειος	Mytilene, *IG* XII 2 81; Methymna, *IG* XII Suppl. 116
10. Φράτριος	Mytilene, *IG* XII 2 25
11. ʽΗφαίστιος	*IG* XII Suppl. 29
12. Ποσίδεος	*IG* XII Suppl. 29

There are a number of difficulties attached to assignment of the months of *IG* XII Suppl. 29 to Lesbos. Of the four months on that stone, only one, Apollonios, is attested certainly on Lesbos; *IG* XII 2 505, Methymna; XII Suppl. 139; that month itself is a rather general Aeolic month, attested also in Thessaly, Phthiotis, and Tauromenium. Dios (Deios) too is rather widely attested, and is not exclusively Aeolic.[1] But even more difficult is attestation for months not included in Hiller's list. Apollonios, among the best attested, is not included, unless Apellaios is an error for this. Strabo XIII, 1, 64 states: παρ' Αἰολεῦσι δὲ τοῖς ἐν Ἀσίᾳ μείς τις καλεῖται Πορνοπίων. If Strabo's authority is to be accepted for the Kleanaktidai it must be accepted for this as well.[2] Then there is the problem of Daisios. It is attested in the texts (*IG* XII Suppl. 136 and perhaps *IG* XII 2 81) as early as the beginning of the second century B.C. May it not be Lesbian? Further, there is attested in *IG* XII 2 69a ν]εομ[ηνία τ]ῶ Πανο[and from the indications of the letter forms, this probably cannot be read as Πανθ[ήιω. Also, in *IG* XII 2 59, we find μῆννος Πομ̣[. Finally, in *IG* XII 2 500, there is a μῆννος Πτ··· which, if correct, will not fit with any of Hiller's months.

If these reservations be accepted, our list of months is much changed, and we have no indications of order. The months attested, based on the evidence already cited, are:

Ἀγερράνιος	Eresos *IG* XII 2 527
Ἀπολλώνιος	Methymna *IG* XII 2 505; Suppl. 139
Δαίσιος	Eresos? *IG* XII Suppl. 136, Mytilene, *IG* XII 2 81
Διο[	Methymna *IG* XII 2 505
Θεδαίσιος	Mytilene *IG* XII Suppl. 136
Κορύδιος	Mytilene *IG* XII 2 81
ʽΟμολοῖος	Eresos *IG* XII 2 527
Πανθήιος	Mytilene *IG* XII 2 81, Methymna, *IG* XII Suppl. 116
Πανο[	Mytilene *IG* XII 2 69a
Πομ̣[	Mytilene *IG* XII 2 59
Πορ̇νοπίων	"Aeolian" Strabo XIII 1, 64
Πτ . . .	Methymna *IG* XII 2 500
Τε]ρφείος	Mytilene *IG* XII Suppl. 138 + Methymna and Antissa?
Φράτριος	Mytilene *IG* XII 2 25

The Count of Days

The count within the month is even more poorly attested than the names themselves. The nomenclature found in the texts is limited to:

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[1] It may indicate something, I am not sure what, that Hephaistios and Posideios (in this form) are not attested elsewhere at all. Dios, as has been noted, may be indicated by *IG* XII 2 502.12.

[2] Bischoff, *Leipz. Stud.* 1884, p. 350, accepts the form of the name as Strabo gives it, despite the known tendency to Atticize the names of non-Athenian months.

1. νεαμέρα	*IG* XII 2 81; Suppl. 139: νεομηνία *IG* XII 2 69a; 646b
4. τετάρτα	*IG* XII 2 527; τεταρίω *IG* XII 2 500
5. πέμπτη	*IG* XII 2 505
6. ἕκτα	*IX* XII 2 527
7. ἑβδόμα	*IG* XII 2 81; 527
9. ἐνάτα	*IG* XII 2 81
18. ὀκτωκαιδεκάτα	*IG* XII Suppl. 138
20. εἰκοίστα	*IG* XII 2 6

75. *The Northern Aegean*

There is very little testimony to the calendars of the islands of the northern Aegean, and there has been little discussion of the scanty evidence. The only modern treatment of any of the calendars has been that of Pouilloux,[1] and his discussion of the calendar of Thasos, with only six month names attested, illustrates the state of our knowledge. In the lists which follow, months appear in alphabetical order unless good evidence indicates actual order, and months are followed by any attested dates of the month.

Thasos[2]

Ἀπατουριών	*Et. Thas.* III, p. 139, No. 18.5/6 V B.C.
Ἀρτεμισιών	*IG* XII Suppl. 355.2 (corr. *Et. Thas.* III, p. 414 n. 6)
Γαλαξιών	*IG* XII Suppl. 365.23; *Et. Thas.* III, p. 139, No. 18.13
Ἑκατομβαιών	*IG* XII 8 264.3 IV B.C.
Θαργηλιών	*IG* XII Suppl. 353.14.
Πλυντηριών	*IG* XII Suppl. 347.2
τρίτη ἱσταμένο	*Et. Thas.* III, p. 139, No. 18.13
δε[κάτηι]	*IG* XII Suppl. 349.4.
εἰνάτη ἀπιόντος	*Et. Thas.* III, p. 139, No. 18.5
πρὸ νεομηνίης	*IG* XII Suppl. 347.2.

Samothrace

Μαιμακτηριών	*Inscr. Samoth.* 5, II B.C.
Ποσειδεών	*IG* XII 8 169, II B.C.

Imbros

Ἑκατομβαιών	*IG* XII 8 47

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[1] J. Pouilloux, *Recherches sur L'histoire et les cultes de Thasos*, *Et. Thas.* III, Ec. Franc. Ath., Paris, 1954, pp. 456–458.

[2] *Ibid.* Pouilloux suggests, p. 149, that the year began with the winter solstice, and points to a resemblance with the calendar of Paros. A further month, Posideon, is suggested, p. 457.

76. Calchedon

Although only a few months are attested, the order, if not the precise positions in the year, can be deduced from the texts. In *Syll.*³ 1011, Apellaios seems to begin the year, while in *Syll.*³ 1009, the mont Machaneus probably begins the group, in which the sequence of Petageitnion and Dionysios seems secure.

Μαχανεύς ᾿Απελλαῖος	*Syll.*³ 1011
Μαχανεύς Πεταγειτνιών Διονύσιος	*Syll.*³ 1009
Ποτάμιος	unplaced. *GDI* 3053

77. Zelea (Phrygia)

*Syll.*³ 279 provides the months ῾Ηραῖος, Κεκυπώσ[ι]ος, ᾿Ακάταλλος, presumably in that order.

78. Lampsacus

Six months are attested, and four of these appear in *CIG* Add. 3641b: Βαδρομιών line 7, Ληναιών, Λευκαθιών, line 17, and ᾿Αρτεμισιών, line 41. It is clear that Leukathion follows Lenaion, and Hermann took Badromion as the first month.[1] In addition to these, we have ᾿Απατουριών attested in *Et. Thas.* V, p. 24, No. 171 (= *SEG* XIII 458), and ῾Ηραιών, *BCH* 17, 1893, p. 555, No. 57.

Bischoff's assignment of the months,[2] Badromion (1), Lenaion (5), Artemision (7), Leukathion (10), Heraion (12), was based partly on the structure of the months as they appear in *CIG* Add. 3641b, and fitted the analogies of other Ionian calendars. Following this reasoning, Apatourion, which has appeared subsequently to Bischoff's discussion, would follow close upon Badromion, although I doubt the security of any reasoning based on analogy other calendars.

79. Ilion

Only the month Σελεύκειος is attested, clearly designated as belonging to Ilion in *OGI* 444.

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[1] *Monatskunde*, p. 100.

[2] *RE* s.v. Kalender, p. 1585.

80. Skepsis (Troad)

Θεσμοφόριος	*Revue de Philologie* 23, 1899, p. 286, note 2 reports, referring to *Festschr. H. Kiepert*, 1898, p. 231, Abb. 4
Φράτριος	*Öst. Jahreshefte* 3, 1900, p. 54

81. Gambreion (Mysia)

Θαργηλιών	*CIG* 3562 (cf. also *CIG* 3597, for Πανή]μου in an unidentified city in Mysia)

82. Sardis

Insofar as Greek month names are concerned, almost all the evidence from Sardis yields Macedonian names,[1] and the following are attested: Dios, *Inscr. Sardis* 129, Apellaios, 115, (Audnaios), Peritios, 132, (Dystros), Xandikos, 139, Artemisios, 118, Daisios, 105, (Panemos), Loos, 119, (Gorpiaios), Hyperberetaios, 112. The evidence comes well after the conquest of the East by Alexander, and I have little doubt that the generation of the list is due to the Macedonian conquest. The calendar structure may have been Seleucid, although the count of days (below) does not seem to have been of the Seleucid type, and evidence lacks to determine the beginning of the year or the internal workings of the calender.

The calendar was probably lunar. A text of the Roman period *Inscr. Sardis* 18, (459 A.D.) gives the calender equations Πρὸ πέν[τ]ε καλανδῶ(ν) Μαΐων – μηνὸς Δεσίο[υ] τετάρτῃ. The Roman date is the 27th of the month, and the differential indicates a lunar quality to the Greek months. This lunar character is further supported by the nature of the count of days (below), which breaks the last decad of the month as does the count in most Greek lunar calendars.

The Count of Days

Numerals seem to have been used for the first twenty days. We have a figure as low as β in *Inscr. Sardis* 124, the count progresses forward in *Inscr. Sardis* 127 through ι, ια in *Inscr. Sardis* 112 (βι in *Inscr. Sardis* 114) to κ in *Inscr. Sardis* 105.[2] For the last third of the month the count proceeded separately, with the term ἀπιόντος used, either with a numeral, e.g., η in *Inscr. Sardis* 119, or written out, as τετράδι ἀπιόντος in

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[1] The exceptions are an early month Πρώτου ιϛ' *Inscr. Sardis* 106b, and a relatively late and fragmentary μηνὸς δ' [. . .], *Inscr. Sardis* 122. They may indicate a formal set of months with numbers, but there is no other testimony to this.

[2] Possible exceptions, [ ] δεκάτη *Inscr. Sardis* 110, if properly understood, and the very late *Inscr. Sardis* 18 of 459, do not seem to me to disturb the conclusion that the count in this part of the month generally used numerals.

Inscr. Sardis 118,[1] or ἀπιόντος ἕκτη, *Inscr. Sardis* 125. There is one instance of the use of Σεβαστή, *Inscr. Sardis* 131, but this may be an influence without indicating a change in the count. The nature of the count is like that of many neighboring Ionian cities. It may be that the count, influenced in that way, was imposed on a lunar calendar of Seleucid nature, and should not be taken as an argument against the assumption that the calendar was in fact the Seleucid, in use in so many parts of the East in the Hellenistic period.

83. Laodikeia epi Lyko

The few texts from this site introduce a small but interesting collection of data about the calendar. There is an honorific month attested, if the restoration is correct: 'Αν]/[τιοχ]εῶνι in *MAMA* VI 5.16/17, of the third century B.C. A month of Macedonian type, Γορπιαῖος, is found in a second century B.C. text, *MAMA* VI 10.2. Perhaps most interesting is *MAMA* VI 18, a text of the Roman period, in which μη. γʹ ιή is equated to τῆ πρὸ αʹ καλανδῶν Νοεμβρίων. The "third month" would have begun on 14 October, and the editors suggest that this calendar dates from Hadrian's visit in 129, at which time a new era began at Laodikeia; the editors suggest that Hadrian's arrival was 14 August, to begin a year in a new calendar in which the third month would begin on October 14.

The practice of numbering months is attested in the region, e.g., at Kolossai, μη(νὸς) ηʹ ζʹ *MAMA* VI 42 and at Apameia on the Maeander, [μη.] ιαʹ, δʹ *MAMA* VI 214.

84. Stratonikeia (Caria)

Ἡρακλεών is attested in *BCH* 11, 1887, p. 227

85. Antiocheia in Pisidia

The very fragmentary *Inschr. Magn.* 81 mentions the month Smision, Σμισ[ιῶ]νος, and subsequently refers to the δ[ῆμ]ος ὁ 'Αντιο[χέω]ν. The editor, O. Kern, suggests that the text might be a decree of Antiocheia in Pisidia.

86. Termessos

In *Tit. As. Min.* III 1 4, two months appear, Σωτήριος in line 1, and 'Ιδαλιάνιος in line 15. The Σωτήριος in line 1 is the month read as ΗλιΩΝοΣ by Lankoronski,

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[1] It is worth noting that Daisios τετράδος ἀπιόντος = Taurcon τετράδος ἀπιόντος at Ephesus in *Inschr. Perg.* 268.

Städte Pamphyliens und Pisidiens II, 1892, p. 199, and reported as the month name by Bischoff, *RE* s.v. Helion, p. 46. The month Θεσμοφόριος is attested in *Tit. As. Min.* III 1 263. See also below. p. 151, for Termessos under Ptolemaic control.

87. Antiocheia in Persis

From *Inschr. Magn.* 61 we obtain two months, Πάνθεος and Ἡράκλειος.

88. Crete

The continuing re-examination of inscriptions from and related to Crete has generated a series of studies of the calendars of the various cities on the island. Despite changes in detail, it has been clear from the start that the various cities had calendars with month names which were quite different, one from the others, but that the different months in the different cities were co-incident with each other.

The detailed study by Maiuri set forth the conclusion he was able to reach with the data available to him at the beginning of the century.[1] Maiuri proposed a series of identifications of months, positioning them within the individual calendars and relating them both to each other and to the Athenian list. Although there are a number of calendar equations among the Cretan cities, there are none which directly connect a Cretan month with, let us say, an Athenian, and the positions of the months within the calendars must be deduced by analysis of the transactions themselves. Maiuri's conclusions were broader than his followers were willing to accept. While Bischoff accepted a few sequences,[2] he was content merely to list the remaining months attested in the differing calendars.

Similar caution was displayed by Guarducci, in what is the most recent examination of the Cretan calendars.[3] Guarducci has proposed locations for only four sets of months, the last two and the first two of the calendar year. The assignment of positions is made on the basis of references forward and backward within individual texts. For example, *Inscr. Cret.* 4, 181, treating of restitutions between Knossos and Gortyn, suggests that the interval between the date (Knossos) Karneios = Ionios (Gortyn) and the prospective date (Knossos) Karonios = Leschanorios (Gortyn) is a period of two months, and further, that the latter is the beginning of the year.

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[1] A. Maiuri, "Il Calendario Cretese," *Rendiconti della Reale Accademia dei Lincei, Classe di Sc. Mor. Stor. Fil.*, Ser. 5, 19, 1910, pp. 109–129.

[2] *RE* s.v. Kalender, pp. 1581–1582.

[3] M. Guarducci, "Note sul calendario cretese," *Epigraphica* 7, 1945, pp. 72–87.

Names and Order of the Months

I set forth below Guarducci's list, with the unplaced months and sets of months following it. References are to *Inscr. Cret.*

Attic	Knossos	Lato	Olos	Gortyn
		4, 181		
Pyanepsion? = 1, xvi, 4	1. Κορώνιος	. αρτιωβιάριος	Δελφίνιος	Λεσχανόριος
		1, xvi, 4		
	2. Νεκύσιος	Θεσμοφόριος	Ἀπελλαῖος	Ἀμυκλαῖος
		4, 182		
	11. Καρνῆιος			Ἰόνιος
		4, 181		
	12. Σπέρμιος	Θιοδαίσιος	Ἐλευσίνιος	]θίος (Βακίνθιος?)
		1, xvi, 4		
		Θερμολαῖος	Ἡραῖος	
		1, xvi, 5		
	Ἐλχάνιος	Βακίνθιος	Ἀ[γρία]νιος	
		1, xvi, 3		
	Ἀγυῆ̣[ιος		Καρ]ν̣ῆιος Καν]] (cf. Καννηιος 4, 172; 235)	
		4, 197		
	Ϝακίνθ[ιος 1, viii, 4. cf. Guarducci, 1945, p. 83		Γενχάνιος/[Ϝ]ελκανί[ο̄ι 4, 184 4,3	

Hierapytna		*Priansos*
Ἱμάλιος	3, iii, 4	Δρομιῆιος
Θεοδαίσιος	3, iii, 7	

Aptera

Δ[ι]κτ[υ]νναῖος	2, iii, 1
Φθινοπώριος	2, iii, 17

Dreros

Κομνοκάριος Ἁλιαῖος	1, ix, 1
Ὑπερβοῖος	*SEG* XXIII 530

Biannos

Ἐλε[υσίνιος]	1, vi, 2

Lyttos

Πάναμος	1, xviii, 9

Malla

Βακ[ίνθιος]	1, xix, 3

Praisos

Διονύσιος	3, vi, 7

Axos

AI Σ . . . . σθαι	*SEG* XXIII 556

In addition to this list, there are three months hitherto listed, but which should probably be removed from the list. The month name Kallidromos, at Tylisos, as read in *IG* XII 5 (2) 868, disappears when that name is read as a patronymic pertaining to a preceding name, and the Sminthios in *IG* II² 1131 may be excluded as Rhodian, while the Artamitios in *CIG* 3052 may also be excluded.[1]

The Count of Days

The instances of designation of days are not numerous, but such as there is, the evidence points to similar counts in various cities. 4, 181, indicates that the first of the month was called νεμονήια at both Knossos and Gortyn, and 1, xvi, 4 shows the second day called δευτέρα at Knossos, Lato, and Olos. Τετράς is attested for Gortyn and Knossos in 4, 197, and a πένπτα at Gortyn in 4, 3. At Malla, we have a ἕκτα in 1, xix, 3, at Gortyn a δεκάτα in 4, 182 and at Lato and Olos in 1, xvi, 5. The subsequent days build on ten, as τρίτα καὶ δεκάτα, 4, 235 (Gortyn) and ἠνάτα καὶ δεκάτα at both Knosos and Gortyn, 4, 181. *SEG* XXIII 530 yields ἰκάς, for Dreros, while 1, xvi, 5, shows τριακάς for both Lato and Olos. There is nothing attested for the last third of the month except κή at Lyttos, in 1, xviii, 9, and this form of enumeration may not be indicative of the native style, but may be influenced by Macedonian or even Roman practice.

89. Tauromenium

Although the order of the months known to him had long ago been set forth by Bischoff,[2] the full list of months in the calendar of Tauromenium has only been known recently from an inscription published in 1964 by Manganaro.[1] The names are found in a number of financial accounts, and by succession in the lists, positions on the stones, and summaries of accounts, the calendar becomes fully known.

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[1] Guarducci, *op.cit.*, p. 87.

[2] First in *Leipz. Stud.* 16, 1893, pp. 153 f.,then *RE* s.v. Kalender, p. 1579.

1. 'Αρτεμίσιος	*IG* XIV 423	*Cronache* 3, pp. 43 ff.
2. Διονύσιος		
3. 'Ελλόκιος ('Ελ[λοκίου]		
4. Δαμάτριος		
5. Πάναμος		
6. 'Απελλαῖος	*IG* XIV 426	
7. 'Ιτώνιος	*IG* XIV 427	
8. Καρνεῖος		
9. Λάνοτρος		
10. 'Απολλώνιος		*Cronache* 3, pp. 43 ff. (here entered a resume for 6 months)
11. Δυωδεκατεύς		
12. Εὐχ̣λεῖος		

These positions are supported by other texts from Tauromenium in *IG* XIV, and the intercalary month is shown to have been Apellaios, from 'Απελλαῖος δεύτερος in *IG* XIV 429.

90. Syracuse

A decree of the senate of Syracuse, *Inschr. Magn.* 72, is dated 'Απο[λλωνίου··· ἱσταμένου. Only one other month is attested, Καρνεῖος, by Plutarch, *Nic.* 28, on the 26th of which Nikias was captured by the Syracusans. Plutarch equates the Syracusan month to the Attic Metageitnion. The event, and the Syracusan month, came after the lunar eclipse of 27 August 413, so that the correspondence reported by Plutarch seems correct for the time.

91. Acragas

Καρνεῖος	*IG* XIV 952

92. Gela

Καρνεῖος	In the second semester: *IG* XIV 256

93. Rhegium

Ἵππιος	*IG* XIV 612

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[1] G. Manganaro, "Iscrizioni latine e greche dal nuovo edeficio termale di Taormina," *Cronache di Archeologia e di storia dell' Arte* 3, pp. 38–68, and esp. 42–46. The shift to the Roman calendar is shown by the mention of the calends of December in the inscription in the Appendix to this article, pp. 53 f., and by the appearance of October in the later text of *IG* XIV 444.

94. Neapolis

Ληναιών	*IG* XIV 76
Πανθεών	*IG* XIV 759

95. Heraclea

’Απελλαῖος	*IG* XIV 645.2
Πάναμος	*IG* XIV 645.101

96. Locri

The data for the months at Locri comes from a series of bronze tablets from the temple of Zeus at Locri, published by A. de Franciscis in a series of articles "L'Archivio del tempio di Zeus a Locri," in *Klearchus, Bolletino Dell' Associazione Amici del Museo Nazionale di Reggio Calabri*, beginning in 1961. The fullest discussion of the months appears in *Klearchus* 1961, pp. 157ff.; the names and order as De Franciscis concludes, are:

’Απελλαῖος
’Αρταμίτιος
Βουκάτιος
’Αθαναῖος
Παλαμναῖος
Διονύσιος

’Αγρήιος
Δαμάτριος
‘Ηρακλεῖος
Πάναμος
‘Ιπποδρόμος
–
’Εμβόλινος

CHAPTER IV

CALENDARS OF THE HELLENISTIC KINGDOMS

Alexander's conquests and the subsequent settlement of Greeks and Macedonians in the territories of the East brought to the successor kingdoms a number of calendaric systems based on the Macedonian nomenclature for months and days. Although Macedonian month-names were used extensively in these areas the actual calendars differed drastically, depending as they did upon the differing rapprochements made between Macedonian and local systems. Many of these local systems are very well attested, and we can see clearly how they worked. On the other hand, the Macedonian calendar itself, that is, the calendar which might be called "pure" Macedonian, as it worked in Macedonia itself, or at most, in old Greece, is very poorly attested. What can be known about the original Macedonian calendar must be deduced from knowledge of the offshoots in the East, with only occasional supplements and support from Macedonian epigraphical material. Thus, any discussion of the Macedonian calendar must begin, not with the original calendar, but with the adaptations of it.[1]

1. *The Seleucid Calendar*

When Alexander the Great marched his army into Babylonia he brought the Macedonians into contact with a calendar better than any used for civil purposes in any

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[1] One of the major obstacles to understanding the Macedonian calendar itself, or any of its offshoots, has been the improper use of evidence from the literary and astronomical sources. There are a number of citations of Macedonian dates in, e.g., Ptolemy and Plutarch, and these dates have been used at different times, willy nilly, as evidence for one or other of the "Macedonian" calendars. Some of the evidence is of first class value, when the nature of the calendars used can be demonstrated. Other items may be of no value at all, but may attest the state of one system long after it had been assimilated to some other calendar and had no independent existence, as, for example the Macedonian calendar in Egypt lost independent existence sometime after the end of the third century B.C. Other items of evidence may be of limited value if the true nature of the evidence is understood: what is said about the "Macedonian" calendar may have nothing whatever to do with the original Macedonian calendar with no probative value whatever for that calendar, but if the evidence can be related securely to one of the offshoot calendars it may be used to demonstrate the nature of that calendar.

Greek city. This calendar provided for intercalations in a 19 year cycle, to keep the lunar year in concord with the longer seasonal year. The final standardization of intercalation had occurred no later than 367 B.C.,[1] so that the cycle had been stabilized well before the arrival of the Macedonians.

Macedonian and Babylonian Months

The Babylonian months were lunar in nature and began with observation of the first visibility of the crescent in the evening.[2] The twelve months were: Nisanu, Aiaru, Simanu, Duzu, Abu, Ululu, Tashritu, Arahsamnu, Kislimu, Tebetu, Shabatu, and Addaru. The structure of the cycle inserted seven lunar months over a period of 19 years: in the year 3, 6, 8, 11, 14, and 19 of each cycle a second Addaru was intercalated, and in the 17th year of each cycle a second Ululu was intercalated. There is no doubt the existence of this cycle, or of its use for civil purposes in Babylonia.

Three citations of dates by Ptolemy show that the Macedonian calendar (i.e., Seleucid) was equated to the Babylonian calendar and followed the Babylonian 19 year cycle. Ptolemy cites a Macedonian month κατὰ Χαλδαίους with its Egyptian equivalent in *Almagest* IX (Heib. II, p. 268), a later equation immediately before in the same chapter (Heib. II, p. 267) and again in *Almagest* XI (Heib. II, p. 419). These equations, with the first day of the month required by the Egyptian date, together with the true date of first visibility, may be presented in tabular form:[3]

	First day of Macedonian Month	Calculated 1st visibility (Babylon)
Thoth 27 = Apellaios 5, year 67 Sel.	14 Nov. 245 B.C.	14 Nov.
Thoth 9 = Dios 14, year 75 Sel.	16 Oct. 237 B.C.	16 Oct.
Tybi 14 = Xandikos 5, year 82 Sel.	26 Feb. 229 B.C.	25 Feb.

The Babylonian equivalents of the months beginning on these dates are Arahsamnu, Tashritu, and Addaru, and if the three Macedonian equivalents are aligned with their counterparts in the Babylonian calendar, it is clear that the two calendars mesh perfectly.[4]

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[1] An abundance of cuneiform evidence has made it possible to offer precise (within limits of computation) equivalents of Babylonian months in the julian calendar from 347 B.C. to 75 A.D., and probable equivalents from 626 to 347 B.C. As we now have a great deal of evidence of intercalary months, it is possible to present tables of julian equivalents of Babylonian months. This has been done by R.A. Parker and W.H. Dubberstein, *Babylonian Chronology, 626 B.C. – A.D.* 75, Brown University Studies XIX, Providence, Rhode Island, 1956. Parker and Dubberstein also present a bibliography of the significant works in this field.

[2] Parker and Dubberstein point out (p. 3) that in the present state of our knowledge it is impossible to determine whether the observation of the crescent was ever replaced by calculation. Similarly, it is not possible to know whether observation within the 19 year cycle might have determined the first of the month.

[3] See also, Samuel, *Ptol. Chron.*, for citation of earlier discussion of these dates.

[4] The Macedonian month-names, and their

Nisanu = Artemisios
Aiaru = Daisios
Simanu = Panemos
Duzu = Loios
Abu = Gorpiaios
Ululu = Hyperberetaios
Tashritu = Dios
Arahsamnu = Apellaios
Kislimu = Audnaios
Tebetu = Peritios
Shabatu = Dystros
Addaru = Xandikos

That Apellaios = Arahsamnu in 245 B.C., Dios = Tashritu in 237 B.C., and Xandikos = Addaru in 229 B.C., as shown by the calculation from the dates attested by Ptolemy, demonstrates that the Macedonian calendar had been equated to the Babylonian at least as early as 245 B.C.,[1] and Malalas (p. 257, Oxford ed.) explicitly states that Seleucus I ordered the Syrian (Babylonian) months called by Macedonian names. The evidence pertaining to the death of Alexander the Great suggests that it is very probable that the assimilation of the Macedonian months to the Babylonian calendar took place quite early in Babylonia, and happened, in fact, before Alexander died. The date of Alexander's death, on the Macedonian calendar, was Daisios 29 (Plutarch, *Alex.* 75, Daisios 30, based on Aristobulus; *Alex.* 76, Daisios 28; the apparent contradiction resolved by Beloch, with the selection of Daisios 29 as indicated by the sources.[2]). The testimony of an entry of a tablet in an astronomical diary[3] gives the Babylonian date: Aiaru 29 ("month II, Babylonian day 29, king died"). That Daisios in 323 B.C. was aligned with Aiaru in the position required by the synchronisms of Ptolemy suggests very strongly that the Macedonian months had been assimilated to the Babylonian at some time before Alexander's death in 323 B.C.[4] The Macedonian month may have been an observation month, so that the assimilation of the two calendars would have been a simple matter of aligning the months, all of which would have been in accord with the moon. Indeed, the assimilation may have been accomplished merely by making permanent the relationships as they stood when Alexander took Babylon.

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order, are attested widely. See above, p. 139. For the argument presented here, see also, e.g., Ginzel II, pp. 1 ff. and J. Johnson, *Dura Studies*, Philadelphia, 1932, pp. 4–6 (Thesis, Univ. Pennsylvania).

[1] Johnson, *op.cit.*, p. 6, pointing to the "inherent probability" that Seleucids adopted the Babylonian scheme completely, adduces the further proof that to make Dios begin in October, as the Egyptian equivalent proves that it did, and thus fall with Tashritu, intercalation in the Macedonian calendar would have had to follow precisely intercalation in the Babylonian calendar.

[2] *Gr. Gesch.* IV, 2, p. 27. The reasoning is that the 28th is based on a calendar with a morning epoch for the day, and the 30th based on an evening epoch for the day, so that Daisios in a hollow month would move directly from the 28th to the 30th, last day. Cf. Samuel, *Ptol. Chron.* p. 46.

[3] A.J. Sachs, *Late Babylonian Astronomical and Related Texts*, copied by T.G. Pinches and J.N. Strassmaier, Brown Univ. Studies 18, Providence, 1955, no. 209 (see p. xiii).

[4] This presumption is enforced by the requirements of the 19 year Babylonian intercalation cycle (the same argument used by Johnson, *op.cit.*, p. 7, to prove the complete assimilation later). If there was any assimilation at all, it must have been complete in 323 as a second Addaru had been intercalated in March, and with any assimilation at all, the Macedonian calendar would have had to have intercalation also to bring Daisios into accord with Aiaru. That there was some assimilation is attested by the inherent great improbability that Daisios would have fallen in position with Aiaru just by chance.

In the Seleucid calendar, with Macedonian month names assigned to the months in the Babylonian cycle, Dios was the first month and corresponded to Tashritu, the seventh Babylonian month, beginning the second half of the Babylonian year after the autumnal equinox. Thus, corresponding to the Babylonian intercalation of Addaru and Ululu in years 3, 6, 8, 11, 14, and 19 of each cycle, a second Xandikos was intercalated, and in year 16 (= 17th Babylonian year) a second Hyperberataios (twelfth Seleucid month) was intercalated.

Although this relationship between Macedonian and Babylonian months persisted in Syria and Mesopotamia at least until 16/17 A.D.,[1] the determination of the first month of the year varied in place, and possibly in time. The Babylonian calendar continued in use by the scribes in Babylonia, for whom the new year began with Nisanu, even after the adoption of the Seleucid era (q.v.), the first year of which began in 311 B.C., April 2–3 (= Nisanu 1). The evidence of coins from Seleucia on the Tigris shows that the Babylonian calendar, with Nisanu = Artemisios as the first month, was in use during the Parthian period and can be demonstrated for 15/16 A.D.[2] With this evidence for the survival of the Babylonian new year, it will be safest to assume the strict Seleucid; ystem with Dios as the first month only in the Seleucid west during the life of the dynasty, and perhaps even more restrictively, only in Greek texts dated by the Seleucid era and by a Seleucid monarch. However, this is more a theoretical than a real problem in dating, since the correlation between Macedonian and Babylonian months makes determination of julian dates certain regardless of New Year's day, so long as the correlation Nisanu = Artemision remained constant.

That a shift occurred in that relationship is now recognized. Johnson has demonstrated[3] by a Dura horoscope which requires that Panemos begin on June 25–26 in 176 (= Duzu 1 by the 19 year cycle, which ought to have corresponded to Loios 1) showing that the relationship between the Macedonian and Babylonian months had changed slightly, with the Macedonian series retarded by one month. Johnson's thesis is supported by the appearance of two cases of Dystros embolimos at Dura,[4] *vice* the expected Xandikos, which would have been the intercalated month in the earlier system, and by Josephus' citation of Dios as the second month in the Macedonian year.[5] Johnson concluded[6] that the change took place at some time between 229 B.C., the last of the dates of the old series attested by Ptolemy in the *Almagest*, and the first century B.C., immediately preceeding Josephus. Johnson's arguments were confirmed and the date of the change made more precise by McDowell. The sequence of coins of 15/16 A.D. at Seleucia on the Tigris fits the Macedonian-Babylonian relationship of Ptolemy, showing that the retardation of the Macedonian months post-dated 16 A.D. Further, a group of coins was struck at Seleucia in 46/47 A.D., bearing months of year 357, Seleucid era, Gotarzes II. The months are an uninterrupted sequence from Xandikos to Hyperberetaios, if Xandikos is the first month, with retardation having taken place. If the retardation is not accepted, there is an interval between Hyperberetaios, the 6th month, and Xandikos, 12th month, an interval which is unlikely *a priori*, and particularly unlikely in the case of these coins, which are unique among Parthian bronze in having month dates, so that we should hardly expect to find two instances of month dates with coins of this type issued on two occasions.[1]

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[1] See below, p. 143.

[2] R.H. McDowell, *Coins From Seleucia on the Tigris*, University of Michigan, Ann Arbor, 1935, pp. 147–150. The coins, dated by month and marked with moneyers' monograms, show an intelligible sequence only when Artemisios (= Nisanu) is taken as the first month. In this way, there is an unbroken series with one monogram from Gorpiaios (month 5) through Audnaios (month 9). A second series, with a second monogram, then begins in Peritios (month 10), and continues through Xandikos (month 12), Artemisios (month 1 of the next year) to Peritios again.

[3] *Op.cit.*, pp. 1–2, and 8–12.

[4] Republished as *SEG* II 770 and 771.

[5] *Ant. Jud.* I, 80: ἐν μηνὶ δευτέρῳ, Δίῳ μὲν ὑπὸ Μακεδόνων λεγομένῳ, Μαρσουάνῃ δε ὑφ' Ἑβραίων. The Judean Marchesewan corresponded to Babylonian Arahsamnu, showing that Dios was one month later than Tashritu, to which it had corresponded in the earlier system.

[6] *Op.cit.* p. 11.

Accordingly, we may conclude that a second correlation between Macedonian and Babylonian months was introduced sometime between 15/16 A.D. and 46/47 A.D. This yields the following correlation:

323 B.C. - 15/16 A.D.			
Nisanu	= Artemisios	Tashritu	= Dios
Aiaru	= Daisios	Arahsamnu	= Apellaios
Simanu	= Panemos	Kislimu	= Audnaios
Duzu	= Loios	Tebetu	= Peritios
Abu	= Gorpiaios	Shabatu	= Dystros
Ululu	= Hyperberetaios	Addaru	= Xandikos

46/47 A.D. — 176 A.D.	
Nisanu	= Xandikos
Aiaru	= Artemisios
Simanu	= Daisios
Duzu	= Panemos
Abu	= Loios
Ululu	= Gorpiaios
Tashritu	= Hyperberetaios
Arahsamnu	= Dios
Kislimu	= Apellaios
Tebetu	= Audnaios
Shabatu	= Peritios
Addaru	= Dystros

This arrangement was quite general in the East, and it had been introduced at Palmyra, in all probability, by 17 A.D.[2] Why this should have happened is something of a mystery. Bickerman remarks[3] that we have no knowledge of "when, how, and for what reason" the change took place, and although we can determine *termini* for some places, we do not know whether the change was simultaneous all over so that the *termini* can be combined to set 15/16–17 as the period in which the change took place. It is interesting that it is apparently as early as 17. We may speculate that the cause was a single excessive intercalation ordered by the Parthian king, as Bickerman suggests as a possibility. It may be that the change derives from the promulgation of a new calendar in the early Roman period. It is even possible that the change took place in the court at the end of the Seleucid period, but took a long time to spread through the cities. The evidence is too scanty to confirm or rule out any of these possibilities.

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[1] McDowell, p. 153, also points out that it is unlikely that such coins were issued for the whole year, as it is very unlikely that there would be preserved examples for five consecutive months, and no examples for the next five.

[2] See above, p. 142. The relationship seems to have shifted by Elul of 17 A.D.

[3] *Chronology* 1968, p. 25.

The Count of Days

The normal Seleucid count used numerals for days,[1] and these followed sequence, 1–30; there was no backward count.[2] The evidence for the count in the Seleucid areas, both during the period of the active life of the dynasty and after the collapse of Seleucid rule, is overwhelming.

1. α	6. ϛ	11. ια	16. ιϛ	21. ϰα	26. ϰϛ
2. β	7. ζ	12. ιβ	17. ιζ	22. ϰβ	27. ϰζ
3. γ	8. η	13. ιγ	18. ιη	23. ϰγ	28. ϰη
4. δ	9. θ	14. ιδ	19. ιθ	24. ϰδ	29. ϰθ
5. ε	10. ι	15. ιε	20. ϰ	25. ϰε	30. λ

Territory of the Seleucid Calendar

The geographical spread of the Seleucid system has never been charted, and the evidence suggests that the calendar, as well as the era (q.v.) had broad use in the East. Obviously, the court used it.[3] Calendars attested in the Roman East in areas originally under Seleucid control[4] suggest that their Macedonian month names derive from calendars of the Seleucid system. In Asia Minor, many cities had Macedonian month names,[5] and many of these may derive from either Seleucid or Macedonian-Egyptian calendars. Indeed, the month Gorpiaios is attested in Iran, in the third century B.C.,[6] and one may speculate on the nature of the calendar so attested, and whether it might have been Seleucid. The conversion of any such dates into julian terms, assuming that the date was constructed on the basis of the Seleucid system, has the inherent risk that this might not have been the case. During the period of the life of the dynasty, in areas under Seleucid control, one may make such conversions as a working hypothesis. But when the month names continue to be found in peripheral areas after the dynasty's control over such areas lapsed, the assumption may not be warranted. Such names may have been used with entirely different systems, changed from the Seleucid, just as the introduction of the julian calendar adapted the Macedonian months into the solar julian system.[1]

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[1] There seems to be evidence of occasional writing out of the numeral, as, e.g., *SEG* VII 18, ca. 200 B.C., from Persiana: [μηνὸς τοῦ δεῖνος πρώτηι? ἐπ' εἰϰ]άδι. The restoration of the actual number is hypothesis, but there seems little doubt that the number was written out to present the same kind of count of days as shown by the system of numerals.

[2] The very curious date ἔτους ϛμ' ϰαὶ [ρ' τῶι] ἀγῶνι Χαριστηρίοις ὑπὸ [τρίτην] ἀπιόντος Ὑπερβερεταίου in *OGI* 253 would seem to indicate a different kind of count, perhaps backward, but the restoration itself seems to me to be improbable, and the reckoning may not be Seleucid in any case.

[3] For examples, cf. C.B. Welles, *Royal Correspondence in The Hellenistic Period*, New Haven, 1934, p. 382, Index of Months.

[4] See below, pp. 174 ff.

[5] Cf. for example, the comment by Robert on Apollonia Salbake, in *La Carie* II, Paris, 1954, p. 301, and more generally, the works there cited. For other examples in central Caria, cf. *ibid.*, Index Général, s.v. Calendrier, Mois. See also above, p. 132, Sardis, p. 125, Pergamum.

[6] *Hellenica* 11–12, 1960, p. 83.

2. *The Macedonian Calendar in Egypt*

The rich resources of papyri in Egypt have made it possible to gain extensive insights into the operation of the Macedonian calendar during the period of Ptolemaic reign in that country. A series of equivalent dates, i.e., documents dated by both Macedonian and Egyptian calendars, makes it possible to correlate the two systems, thoroughly in most instances, and partly in others. Since the Egyptian civil calendar was regular and non-lunar in nature, julian equivalents can be derived for Macedonian dates from correlations between Egyptian and Macedonian calendars.

Native Egyptian Calendar

The Egyptian civil calendar has twelve months, each of 30 days, with 5 epagomenal days at the end of the year to make a total of 365 days. Although this total was 1/4 day short of the seasonal year so that the Egyptian calendar revolved with respect to the seasonal and julian years, that revolution was constant, and a julian date can be assigned to any date in the Egyptian calendar, not only for the period of Hellenistic occupation but for the Pharaonic period as well. The twelve Egyptian months were: Thoth, Phaophi, Hathyr, Choiach, Tybi, Mecheir, Phamenoth, Pharmouthi, Pachons, Payni, Epeiph, and Mesore. The beginning of the civil year, Thoth 1, fell in mid-November at the time of Alexander's conquest, and with the 1/4 day annual anomaly, the beginning of the year moved gradually until it fell on 31 August at the time of Octavian's arrival in Egypt.

This Egyptian calendar continued in use all through the Ptolemaic and Roman period. It is amply attested in demotic and hieroglyphic texts, and the Egyptian month-names gradually supplanted Greek names as time went on. The Ptolemaic form of the Macedonian calendar was itself based upon the Egyptian civil calendar.

In addition to this 365 day civil calendar the Egyptians had a lunar religious calendar with the same month names, with months beginning at invisibility of the crescent at the time of new moon.[2] There was a cycle which the Egyptians used to regulate this lunar calendar, as we learn from P. dem. Carlsberg 9. This cycle operated over a 25 year period, instructing the user as to dates on the regular civil calendar on which lunar months were to begin. Thus the lunar calendar could be kept in concord with the actual phases of the moon without actual observation.

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[1] E.G., the "Asian Calendar" introduced in 9 B.C., below, p. 181.

[2] R. A. Parker, *The Calendars of Ancient Egypt*, Oriental Institute of the University of Chicago, Studies in Ancient Oriental Civilization 26, 1950.

Cyclical Regulation of the Macedonian Calendar in Egypt

By the middle of the third century B.C., the Ptolemaic administration had adapted this cycle to the Macedonian lunar months to begin each month on the evening of first visibility of the crescent.[1] The cycle was probably in use as early as the 40th year of Ptolemy Soter, 284/3 B.C., and was certainly in use by year 6 of Philadelphus, 280/79 B.C. (= year 6 counting from the beginning of the co-regency with Soter). The cycle continued in use to the end of Philadelphus' reign in 246,[2] and thus for this period it is possible to find julian dates for Macedonian, since the correlation of Macedonian – Egyptian through the cycle gives a firm datum, the Egyptian calendar, through which to find julian dates.

At this time, the regnal year began in Dystros. The succession of months, Xandikos, Artemisios, Daisios, Panemos, Loios, Gorpiaios, Hyperberetaios, Dios, Apellaios, Audnaios, Peritios, follow the same sequence as the sequence in the Seleucid adaptation of the Macedonian calendar; the intercalary month throughout the reign of Philadelphus was Peritios, called Peritios embolimos when it was inserted. The Macedonian months began on dates set in terms of the Egyptian civil calendar. That is, the cycle marked a specific date in each Egyptian month on which a Macedonian month was to begin. The Macedonian months, following in the order stated, began on the dates set by the cycle. Intercalation was biennial, so that every other year a second Peritios was inserted, beginning on the Egyptian date set for the beginning of the next month. The cycle itself did not contain instructions for intercalation *per se*; the intercalation was simply fitted into the scheme.

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[1] A.E. Samuel, *Ptolemaic Chronology*, Münchener Beiträge zur Papyrusforsch. u. antiken Rechtsgeschichte 43, 1967, pp. 54–73. The cycle was adapted to Macedonian first visibility by simply beginning months one day later than they were to begin for the Egyptian lunar months.

[2] The equivalences, Macedonian = Egyptian, are attested by an extensive series of double dates in the Zenon archive. For the double dates see Samuel, *op.cit.*, pp. 48–49. The equivalences between the two calendars produced by the cycle are the same as the equivalences recorded by Edgar, *Zenon Papyri in the University of Michigan Collection*, University of Michigan Studies, Humanistic Series XXIV, Ann Arbor, 1931, pp. 56–57. Edgar's tables of correspondences carry forward to year 10 of Euegetes, but do not go back earlier than year 25 of Philadelphus. The demonstration that the cycle was in use in year 22, and as far back as year 6 (Samuel, pp. 64–73) makes it possible to date documents much earlier in date than Edgar's tables permit.

Although Edgar's tables, based as they are on the extensive evidence of the later years of Philadelphus, are quite reliable for the period which they cover, earlier attempts to establish the nature of the Macedonian calendar in Egypt, notably E. Meyer, *Untersuchungen zur Chronologie der ersten Ptolemäer auf Grund der Papyri, Archiv für Papyrusforschung*, Beiheft 2, Leipzig, 1925, and B. Grenfell and A.S. Hunt, *Hibeh Papyri* I, London, 1906, Appendix I, pp. 332–358, do not provide satisfactory guides either for equations between the two calendaric systems or julian equivalences, since much of the vital evidence was published after these two discussions.

In addition to the cycle, there were other more arbitrary methods of equating Macedonian to Egyptian dates, See below, p. 148.

The effect of this cycle was to provide a satisfactory concord between the Macedonian months and the moon. However, since the concern was only with monthly and not yearly relationships, the maintenance of a relative stability between the seasonal 365 ¼ day year and the lunar year which the 19 year Babylonian/Seleucid *intercalation* cycle achieved, depended on the nature of intercalation adopted. Biennial intercalation added too many days to keep the balance (ca. 738 days in biennal intercalation, vs. 730 ½ days in the seasonal year, over each two-year period), so that Macedonian months fell later and later with regard to the seasonal year.[1]

During the reign of Philadelphus as well as later, the Egyptian calendar was consistently maintained alongside the Macedonian for the dating of documents, not only in the native language but also in Greek texts. The conversion of these dates into julian is simple, and is achieved through the tables of T.C. Skeat.[2] The Egyptian regnal year began regularly with the first day of Thoth all through the Ptolemaic period. However, the Macedonian regnal year began, at least in the early period, at differing times in different reigns, and this resulted in a disparity between Egyptian and Macedonian regnal year dates reflecting the different beginnings of Macedonian and Egyptian civil calendar years.

The actual date in Dystros on which the Macedonian year began during the reign of Philadelphus is not yet certainly known. *P. Col. Zen.* 8, dated year 28, Dystros 23, docketed year 29, Xandikos 2, shows that the regnal year changed between these two dates. Edgar, discussing this problem,[3] concluded on the basis of *PCZ* 59209, together with *P. Col. Zen.* 8, that the first day of the year must have been Dystros 25 or 26. *PCZ* 59209 is dated year 32, Pharmouthi 3. Because year 32 was not intercalary, Macedonian month dates corresponded to Pharmouthi 3 only at the beginning of regnal year 32, and at that time, Pharmouthi 3 = Dystros 26, so that if year 32 in this document was the Macedonian regnal year, as Edgar took it to be, the year had to begin at the latest on Dystros 26, and by *P. Col. Zen.* 8 at the earliest on Dystros 24. The evidence, however, was controverted by *PCZ* 59139, dated year 29, Dystros 26 = Phamenoth 26. In order for this equation to be correct, it had to fall at the end of the year by the established correspondences,[4] and thus the year had to end later than Dystros 26. I originally took this date to fall at the beginning of the year with the correspondence not an accurate one but an arbitrary one, to explain this contradictory evidence, but since the document belongs in a series at the end of the year, the date must fall at the end of the year.[5] One further piece of evidence may be of value: *PCZ* 59203, dated year 31, Dystros 23 = Phamenoth 30, has the docket year 32, Pharmouthi 1. This very strongly suggests that the regnal year changed with Pharmouthi 1 = Dystros 24, and I have argued for that date.[1] For this date to be accepted, however, it is necessary to reject the evidence of *PCZ* 59139, either by explaining the date as a scribal mistake, a most unfortunate resort, or by suggesting an equally improbable alternative, that the year date 29 was in the Egyptian, not Macedonian regnal year, so that the date need have no relevance to the Macedonian regnal year. However, neither of these alternatives have the merit of proper method, so that the question of the beginning of the regnal year under Philadelphus must be left open, with much of the evidence pointing to a period between Dystros 24 to 26, and the 24th explaining the most evidence.

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[1] So that e.g., in 262 B.C., Dios 1 fell in early November, while only 15 years later, in 247 B.C. Dios 1 fell in the middle of January.

[2] *The Reigns of the Ptolemies*, Münch. Beitr. z. Papyrusforsch. u. antiken Rechtsgeschichte 39, 1954.

[3] *P. Mich. Zen.* pp. 51–52.

[4] Either by Edgar's tables or the cycle.

[5] *Ptol. Chron.*, p. 62. The error was pointed out by Uebel, in his review, *Bibliotheca Orientalis* 21, 1964, p. 312.

Although the cycle was in extensive use during the reign of Philadelphus, at least in Alexandria, other methods of regulating the Macedonian calendar are attested in the Chora. They had in common with the cycle control the use of the Egyptian calendar as reference point. The simplest of these methods was that of direct equation: if a date on the Macedonian calendar was required the writer simply used the same numeral in the (roughly) equivalent Macedonian month.[2] A second method, a bit more complicated, was one of addition and subtraction: for the first 20 days of the Egyptian month 10 days were added to the numeral to produce the equivalent date in the Macedonian month, and for the remaining 10 days of the Egyptian month 20 days were subtracted to produce the Macedonian date.[3] The system was not too cumbersome, although it depended on a general familiarity with the current relationships between the two calendars.

These two arbitrary systems were only used, so far as we know, in making up double dates when the Macedonian date was needed for the proper official appearance. Since the Egyptian date always appeared as part of the arbitrary equation, that date can be relied upon for the establishment of the julian date of documents so dated.[4]

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[1] In *Ptol. Chron.*, pp. 62–63. That document is one of a series of three, dated as follows:
PCZ 59202, year 31,
  Dystros 23 = Phamenoth 30
  docket: year 31, Pharmouthi 1
PCZ 59203, year 31,
  Dystros 23 = Phamenoth 30
  docket: year 32, Pharmouthi 1
PCZ 59204, year 31,
  Dystros 23 = Phamenoth 30
  docket: year 31, Pharmouthi 1
PCZ 59202 is corrected, with Edgar reading in the docket year 31 corrected from 32; Edgar remarked in the publication that the reading could also be 32, corrected from 31. Positing the change of date to a new year at this time, it is possible to understand all the dates in an hypothesis which requires no proposal of uncorrected error by the scribe: all the letters were written on evening of Phamenoth 30, after sundown, when Dystros 23 had begun. *PCZ* 59204 was received the following day, Pharmouthi 1, during the daylight hours, and docketed accordingly. The other two were not docketed until evening, when the new Macedonian day Dystros 24, and with it, the new year, had begun. The docket to *PCZ* 59202 was first made year 31 in error, then changed, while the docket of *PCZ* 59203, docketed presumably after 202, was made without error.

[2] Cf. *Ptol. Chron.*, p. 34.

[3] *Ptol. Chron.*, p. 35.

[4] Although it is theoretically possible that the Macedonian side of such arbitrary equations is the correct one, it is more likely that we are correct in relying upon the Egyptian

Thus, for the reign of Philadelphus julian dates can in general be obtained from either true Macedonian dates, or from ordinary Egyptian dates.[1]

After the reign of Philadelphus the cycle seems to have fallen into disuse. Throughout the reign of Euergetes, Ptolemy III, the attested double dates show no coherent series of equations between the two calendars, but rather, complete disorder. The double dates not only do not fit, one with the others, but there is no consistency in choice of the intercalary month. Peritios, which had been embolimos all through the reign of Philadelphus, is embolimos at one time during the reign of Euergetes, but at other times we find once Hyperberetaios, at another, Panemos. The evidence suggests that for some reason, during Euergetes' reign the Macedonian calendar pursued a course independent of the Egyptian and was itself irregular. There may have been decreasing interest in maintaining an accurate Macedonian calendar, so that its use was desultory and careless. It is therefore not possible to give precise julian dates to documents dated by Macedonian months until the end of Euergetes' reign, when again for a short period we find a consistent relationship in at least one part of the chora.[2]

Abandonment of the Independent Macedonian Calendar

After the 9th year of Philopator, we find only four more double dates which reflect an independent existence for the Macedonian calendar.[3] From year 4 of Epiphanes, Ptolemy V, we find the evidence of a complete assimilation of the Macedonian calendar to the Egyptian. In this assimilation, the Macedonian months were simply equated to the Egyptian. A date in the Egyptian calendar, e.g., Thoth 15, was simply

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unless some evidence points to a strong probability that the writer was using the Macedonian calendar. In the chora, whence these arbitrary dates in general come, the Egyptian months were used, and it is only in the official correspondence and dating of Alexandria that "real" Macedonian dates are to be found.

[1] It is well to introduce one note of caution. All the evidence is not satisfactorily explained by these various systems. There are five (*Ptol. Chron.* p. 60) double dates which are anomolous, and if they are not to be taken as evidence of either another system, or, alternatively as suggesting that the system is not yet properly understood, they must be explained as scribal errors. These errors need not be purely orthographical; maintaining the cycle would be arduous and could often bring errors.

[2] For discussion of the dates of this period, see Samuel, *Ptol. Chron.*, pp. 74–128, and T.C. Skeat, "The Macedonian Calendar during the Reign of Ptolemy Euergetes I," *Journal of Egyptian Archeology* 34, 1948. Skeat argues for a coherent scheme, but I have argued against this since the coherent scheme requires the assumption that certain documents be dated by financial year; further, Skeat's scheme does not show how the calendar worked, but manipulates years and intercalary months arbitrarily to bring the double dates into a rough accord with each other. The varied intercalary month is sufficient evidence to show the disorder in the calendar. The short period in which there is evidence of coherence, year 25 of Euergetes and year 26/1 of Philopator, can provide some indication of the correlation between the two calendars. However, the correlation gives no indication of the actual control of the Macedonian calendar or any evidence of how it was actually working; the correlation can be simply descriptive, and for this short period only, and the correlation is presented in *Ptol. Chron.*, Appendix, Table D., p. 167.

[3] *P. Edfu* 5, year 14 of Philopator. *OGI* 90 (Rosetta Stone), year 9, Epiphanes; *UPZ* 111 and 113, years 18 and 26 of Philometor. Cf., *Ptol. Chron.*, pp. 122–127, 129–137.

rendered in the Macedonian calendar with the Macedonian month name and the same date of the month. In this assimilation, Dystros was equated to Thoth, and the succeeding Macedonian months were equated to the succeeding Egyptian months which fell into line in order. These equations remained the same so long as this system was in use, so that a Macedonian date was simply the rendition of an Egyptian date with a Macedonian month name. The equations for the twelve months are:

Dystros–Thoth
Xandikos–Phaophi
Artemisios–Hathyr
Daisios–Choiach
Panemos–Tybi
Loios–Mecheir
Gorpiaios–Phamenoth
Hyperberetaios–Pharmouthi
Dios–Pachon
Apellaios–Payni
Audnaios–Epeiph
Peritios–Mesore

This system of equating the two calendars persisted into the reign of Ptolemy Euergetes II, but by the 53rd year of that king, i.e., 119/8 B.C., a new system was in effect. In this second assimilation, Dios was equated to Thoth, producing the following set of equations:

Dios–Thoth
Apellaios–Phaophi
Audnaios–Hathyr
Peritios–Choiach
Dystros–Tybi
Xandikos–Mecheir
Artemisios–Phamenoth
Daisios–Pharmouthi
Panemos–Pachon
Loios–Payni
Gorpiaios–Epeiph
Hyperberetaios–Mesore

This system persisted[1] to the end of the Ptolemaic period and continued in use in the Roman era. It may have provided the basis for later (ancient) descriptions of the Macedonian calendar. Since the Macedonian dates have no independent existence but appear in conjunction with Egyptian dates, julian dates may be derived from these Egyptian dates without regard to the Macedonian date.

Thus the Macedonian calendar in Egypt followed a course which eventually ended in the dissolution of the Macedonian calendar as a separate and valid instrument for dating or for the measurement of time. It began with adapting Macedonian months to a cyclical structure which had been constructed for the operation of the Egyptian lunar calendar, just as in the Seleucid area the old Babylonian system was pressed into use for the regulation of intercalation in the Macedonian calendar. But unlike the development of the Seleucid calendar, which, lunar in nature and based on the lunar Babylonian cycle, was preserved as a vital calendar, the Macedonian calendar in Egypt eventually lost all independence and was overwhelmed by the Egyptian calendar. Thus the Macedonian months became simply alternative names for the Egyptian months, and the calendar in Egypt continued the old Egyptian system of twelve months of 30 days each, with all relation to the moon lost.

The Count of Days

The Greeks in Egypt used numerals for the count of days, applying these numerals to all dates, whether expressed in terms of the Egyptian or Macedonian calendars. The numeral system is attested over and over again in the papyri from Egypt, from earliest Ptolemaic to late Roman times.

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[1] With occasional exceptions in which the first system persisted, as in *SEG* IX 5, year 20 of Soter II, and *P. Teb.* 105, year 21 of Cleopatra III and Ptolemy Alexander.

1. α
2. β
3. γ
4. δ
5. ε
6. ϛ
7. ζ
8. η
9. θ
10. ι
11. ια
12. ιβ
13. ιγ
14. ιδ
15. ιε
16. ιϛ
17. ιζ
18. ιη
19. ιθ
20. κ
21. κα
22. κβ
23. κγ
24. κδ
25. κε
26. κϛ
27. κζ
28. κη
29. κθ
30. λ

Territory of the Egyptian-Macedonian Calendar

In the Ptolemaic possessions outside of Egypt Macedonian month names are attested, sometimes in connection with official dating formulae, as at Lissa, in Lycia, for example, we find *Tit. As. Min.* II 1 158 dated by Philadelphus, year 8, Artemisios. Robert has noted the tenacity of the Macedonian calendar in Lycia[1] and the occurence of Macedonian months in official Ptolemaic formulae introduces the possibility that the dates were formed according to the court system of Alexandria. Robert is cautious, referring to these dates as belonging to the "calendrier macedonien" a term he uses equally to apply to dates which might be argued as Seleucid.[2] Since the Macedonian month names were coming into use in many if not the majority of cities in Asia Minor and the East, it is not really possible to determine whether the Macedonian month names in a Ptolemaic possession represent the Ptolemaic calendar in the form in which it was known in Egypt. It would be difficult to preserve the cyclical arrangement outside Egypt, since the cycle depended upon the old Egyptian calendar as its control. Macedonian month names in Ptolemaic possessions may represent local calendars adapted to the Macedonian month list, or indeed may be calendars of the Seleucid type used in cities influenced by Seleucid type. The evidence for each individual city is too scanty to permit determinations.

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[1] *Documents de L'Asie Mineure Meridionale*, Paris, 1966, p. 54, publishing (p. 53) a Ptolemaic date, and citing, p. 54, notes 3, 5, (with texts, cited for other purposes, notes 6–8) other examples of such Ptolemaic dates.

[2] *Ibid.*, and *La Carie* II, p. 301. See above, p. 144.

CHAPTER V

THE ROMAN CALENDAR

1. *Introduction*

The problems of the Roman calendar are quite different from those confronting the student of the Greek calendar. Although only one calendar, i.e., the calendar of only one society, is at issue, the information available about that calendar, at least in its earlier stages, is contradictory and obscure in meaning. Furthermore, Roman society, with its greater attention to the forms of such things as calendars, tied the calender as an independent object rather more closely to religious observation than did any of the Greek states. Whereas in Greece the calendar in its formal aspect was usually an aid (or a hindrance) to the proper timing of religious observation, at Rome the calendar was something of an end in itself, and although there is manifold evidence that the calendar could be tampered with in its operation, the calendar itself was one of the *mores maiorum*, and became a vehicle to which many practices adhered, rather like barnacles on the bottom of a ship. The difficulty in determining what the calendar was like at any one time may indeed be compared to an investigation of an old hull: how many barnacles does one scrape away to establish the state of the hull at a given time in the past?

The Fasti

The ancient sources which provide information are both literary and epigraphical, and of the latter, there are both documents and, unlike the Greek situation, actual representations of the calendar. From this material has come an appalling volume of scholarship, beginning in antiquity and piling up to impossible proportions in modern times.[1] The epigraphical representations of the calendar, the so-called *Fasti*, most surviving from the imperial period, show, in addition to the names of months and days and lengths of months, a whole complex of material which has accreted to the strictly chronological framework of the calendar. Along the top of each of these *Fasti* appear the names of months, proceeding in order from left to right, and with the days of each month listed in columns below the month names. In these columns, a vertical row at the left consists of letters from A to H in alphabetical order, continuing without interruption so that A follows H and begins the series anew each time a series terminates. The so called nundinal letters, which are not referred to in ancient treatments of the calendar, are taken by modern scholars to refer to an eight day cycle of market days,[1] but so far as we know, individual days were never designated by these letters, they were never used for calendaric purposes, but served in the *Fasti* merely as an aid to reckoning the market days.[2] To the right of the nundinal letters come the names of the named days, and to the right of these, or on unnamed days to the right of the nundinal letters, appear letters which are taken to define the nature of the designated day and about which there has been considerable debate. These letters, indicating the religious or political nature of the days, are an illustration of the manner in which the Roman calendar is interwoven with the fabric of Roman life. In the discussion below I shall treat neither the nundinal letters nor the day designations, as they are not chronological devices but rather use the basic chronological device of the calendar for other purposes, and I shall proceed to the discussion of the calendar itself.[3]

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[1] For bibliography one may see, for the nineteenth century and before, Mommsen, *Die Römische Chronologie bis auf Caesar*, 2nd ed., Berlin 1859; Ginzel II, 1911; for the first part of this century, cf. O. Leuze, "Bericht über die Literatur zur römischen Chronologie, (Kalendar und Jahrzählung) in den Jahren 1901–1928." *Jahresbericht über die Fortschritte der klassischen Altertumswissenschaft* 227, 1930, pp. 97–139. More recent studies are cited by A.K. Michels in *The Calendar of the Roman Republic*, Princeton, 1967 and cf. also Bickerman, *Chronology* 1968, pp. 43–49. A complete collection of ancient references to the Roman calendar may be found in Degrassi, *Inscriptiones Italiae* XIII, fasc. 2, Rome 1963.

Month Names and Day Designations

The Roman calendar of the historical period had 12 months: Januarius, Februarius, Martius, Aprilis, Maius, Junius, Quintilis (= Julius), Sextilis (= Augustus), September, October, November, December, and we shall see below the applications of these to the julian year, both in the historical period, and insofar as possible, earlier. The designation of the days within the month was made by a peculiarly Roman system. The first day of the month was called *Kalendae*, the 5th (or 7th in a 31 day month), was called the *Nonae*, and the 13th (or 15th in a 31 day month) was called the *Idus*. These are the named days, and other days in the month were designated by counting back from these named days, counting inclusively. Thus in Maius, a 31 day month, the 2nd = *ante diem VI Nonas Maias*, the 12th = *ante diem IV Idus Maias*, and the

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[1] Cf. e.g., Macrobius *Sat.* 1, 16, 34: "annum ita diviserunt, ut nonis modo diebus urbanas res usurparent, reliquis VII ut rura colerent." The "nine" comes from the Roman custom of counting inclusively, so that the first day of an eight day group is the ninth, with references to the previous group, and again the first of the succeding group.

[2] For a discussion, see Michels, *Calendar*, pp. 27–28, 84–89.

[3] The designations and their meanings is the main subject of Michels' *Calendar*, q.v. for an extensive discussion of them. Michels concludes: N = *dies nefasti*, C = *dies comitiales*, EN = *endotercisus* (intercisus) days "split" between *nefasti* and *fasti*, Q.R.C.F. = *Quando Rex Comitiavit Fas*, Q.ST (or S.) D.F. = *Quando Stercus* (or *Stercum*) *Delatum Fas*, but she has no solution either for NP (usually printed NP) or FP.

25th = *ante diem VIII Kalendas Junias.* This is the general system of designating months and days, although the actual lengths and names of months and even the number of months as well went through permutations in the course of the history of the calendar, and that history saw changes in the beginning of the year and methods of intercalation before Julius Caesar established the julian year in 46 B.C. That julian year as amended by Augustus provided the calendar used until the Gregorian reform (see above, p. 13), and is still used for the designation of dates in antiquity.

In the discussion of the Roman calendar it is easier to work from the known to the unknown, as the basis of discussion and the designations and terminology applicable will be clearer to the reader if a complete account of the calendar can precede the discussion of stages which we cannot yet know fully. Accordingly I shall work backwards in the discussion to follow, beginning with the julian calendar, which we have full knowledge of, and proceeding backwards through the history of the calendar to the most primitive stages about which we have any evidence at all. I may repeat that in this discussion I shall deal only with month and day names, length and order of months, and organization and length of the year, with discussion of any intercalation known.

2. *The Julian Calendar*

The calendar which Julius Caesar instituted in 46 B.C.[1] abandoned the old Roman Calendar completely to start afresh with a calendar of 365¼ days, a period long known by the astronomers to approximate the tropical year (see Astronomical Calendars, pp. 33–55).[2] The new calendar, as reported in the sources[3] and reflected in the Fasti[4] had 365 days, with a single day intercalated every 4th year to achieve the total of 365¼. The names and lengths of the months in the julian calendar are:

Januarius	31	Maius	31	September	30
Februarius	28	Junius	30	October	31
Martius	31	Julius[5]	31	November	30
Aprilis	30	Augustus[6]	31	December	31

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[1] For the date, cf. Censorinus, *De die nat.* 20, 8: G. Caesar pontifex maximus suo III et M. Aemilii Lepidi consulatu.

[2] The 365¼ day year must have been well known, and the discussion of the source of the julian reform (cf. Ginzel II, pp. 274–275 and the discussions there cited) seems to me to be inconsequential. The famous passage of Lucan (*Phars.* X, 186) "Nec meus Eudoxi vincetur fastinus annus" selects a famous astronomer for Caesar to equal.

[3] Censorinus, *op.cit.*, Macrobius, *Sat.* 1, 14, 6ff. (ed. Willis); Plut., *Caes.* 59; Appian, *Civil Wars* II, 154; Dio Cassius XLIII, 26; Suetonius, *Caesar* 20; Pliny, *Nat. Hist.* XVIII, 211; Solinus 1, 45 (ed. Mommsen).

[4] Published by A. Degrassi, *Inscriptiones Italiae* XIII, *Fasti et Elogia*, Fasc. II, *Fasti Anni Numani et Iuliani*, Rome, 1963.

[5] Actually named Quintilis at the time of the 46 B.C. promulgation, but changed to Julius in 44 B.C. in honor of Caesar, Censorinus 22,16; Macrobius, *Sat.* I, 12, 34; Dio Cassius XLV, 7.

[6] Changed from Sextilis to Augustus in 8 B.C., Censorinus 22, 16, Macrobius, *Sat.* I, 12, 35; Dio Cassius LV 6., Suetonius, *Augustus* 31.

The extra day, intercalated every fourth year, was made by doubling VI *Kal. Mart.* (= 24 Febr.) and became *bis sextum Kal. Mart.*,[1] whence the later term *annus bissextus* for the intercalary year. The year began as before (see below, p. 164) with the kalends of January. This julian system, although it seems simple enough to operate, was nevertheless misapplied by the pontifices, who, counting inclusively in the Roman fashion, came up with intercalation which was in effect every third year, e.g., I O O I O O I O O I etc. This error was later corrected by Augustus.

The Augustan Reform

The Augustan correction is connected with the question of whether the year 45 was actually made intercalary by Caesar. It has been much discussed[2] but it is much easier to reconcile a non-intercalary 45 B.C. with the information reported about the Augustan reform. The sources[3] state that the pontifical error persisted for 36 years, in which 12 years were intercalated for the proper 9. Now the only year for which one can achieve a congruence of these three numbers is 9 B.C.: 36 years after the reform brings us to 9 B.C., and that year had the 9th (proper) and 12th (improper) intercalation *only if* 45 *B.C. had not received intercalation.* If it had been intercalary, the 9 = 12 intercalations would have been made in 13 and 12 B.C. respectively, and the intercalations in these years neither fall together as the sources imply nor fit very well with the figure of 36 years for the duration of the (undetected) error. Taking these results along with the sources' statement that intercalation was omitted for 12 years, we see that the (proper) julian intercalation was omitted in 5 and 1 B.C. and in 4 A.D., so that intercalation was resumed in 8 A.D. and the julian system proceded thence without error.

Modern chronologers use the julian system to express dates in antiquity, and extrapolate the dates (and intercalation) back into the pre-Christian period so that, for example, 45 B.C. will be intercalary in the modern framework whether Caesar actually had intercalation in that year or not. This system, although based on the julian, should be seen as a modern construct in which the intercalary years after Christ are those divisible by four, but those before will be those quadrennial anniversaries working back, e.g., 1, 5, 9, 13, 17, B.C. are intercalary. From 8 A.D. on Roman calendar dates are the same as modern julian calender dates, but in the period between 8 A.D. and 45 B.C. allowance must be made for the error and subsequent correction in attempting to render Roman dates into julian. The following chart shows the relationships, the correction to be made, and the years in which February 29 was omitted by Augustus.

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[1] There is room for doubt whether this date precedes *VI Kal. Mart.*, in backwards count, so that: *a.d. bis VI Kal. Mart.* = 24 Febr., *VI Kal. Mart.* = 25 Febr., or follows, so that *VI Kal. Mart.* = 24 Febr, and *a.d. bis VI Kal. Mart.* = 25 Febr. Mommsen opted for the latter, with the bissextile date *following* the first six, notably on the evidence of *CIL* VIII 6979 (= Dessau, *Inscr. Lat. Sel.* 4919): *V K Mart qui dies post bis VI K fuit.* Mommsen has generally been followed, *inter alia* by Bickerman, *Chronology* 1968, p. 47, but for a contrary view, taking 24 Febr. as the intercalary day, see Ginzel II, pp. 278–279.

[2] Cf. Ginzel II, pp. 280–281.

[3] Macrobius, *Sat.* I, 13–14; Solinus, ed. Mommsen, 1, 46, 47.

B.C.	Julian	Error	Correction
45			
44			
43			
42		I 1	–1
41	I 1	1	–0
40	1	1	–0
39	1	I 2	–1
38	1	2	–1
37	I 2	2	–0
36	2	I 3	–1
35	2	3	–1
34	2	3	–1
33	I 3	I 4	–1
32	3	4	–1
31	3	4	–1
30	3	I 5	–2
29	I 4	5	–1
28	4	5	–1
27	4	I 6	–2
26	4	6	–2
25	I 5	6	–1
24	5	I 7	–2
23	5	7	–2
22	5	7	–2
21	I 6	I 8	–2
20	6	8	–2
19	6	8	–2
18	6	I 9	–3
17	I 7	9	–2
16	7	9	–2
15	7	I 10	–3
14	7	10	–3
13	I 8	10	–2
12	8	I 11	–3
11	8	11	–3
10	8	11	–3
9	I 9	I 12	–3
8	9	12	–3
7	9	12	–3
6	9	12	–3
5	I 10	O 12	–2
4	10	12	–2
3	10	12	–2
2	10	12	–2
1	I 11	O 12	–1
A.D. 1	11	12	–1
2	11	12	–1
3	11	12	–1
4	I 12	O 12	–0
5	12	12	–0
6	12	12	–0
7	12	12	–0
8	I 13	I 13	–0

Roman calendar dates can thus be converted into julian dates not only from the beginning of the accurate and correct operation of the system after the Augustan revision, but applying the necessary corrections, as early as 45 B.C. Before that year, however, the Roman dates can not be equated to julian with much confidence, and an account of the year 46, in which Caesar actually instituted his reform and which was modified radically to do this, illustrates the possible discrepancy between Roman and julian years. The only full and clear account of the manipulations of 46 B.C. comes from Censorinus: duos menses intercalarios dierum LXVII in mensem Novembrem et Decembrem interponeret, cum iam mense Februario dies tres et viginti intercalasset, faceretque eum annum dierum CCCCXXXXV, simul providens in futurum ne iterum erraretur.[1] The year 46 B.C., then, had a total of 90 days intercalated, 67 more than the number which would have been inserted in an ordinary intercalary year. These days had accumulated from omission of proper (month) intercalation in the preceding years, and the large number of days involved illustrates the difficulty of finding julian equivalents for Roman calendar days before the Caesarian reform.

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[1] *De die natali* 20, 8. That three months, (the two totalling 67 + the regular intercalary month of 23 days in February) are involved is confirmed by the statement of Suetonius, *Caes.* 40, that these three were intercalated, making a total of 15 months in that year. The extra intercalation of 67 days is reported by Dio Cassius XLIII, 26. The statement of Macrobius, *Sat.* I, 14, 3, that 443 days are involved, is either a scribal error or a misstatement, in an account which is on this matter very brief. Solinus' account (1, 45) makes no sense at all as the text stands.

3. The Calendar of the Republic

In dealing with the pre-julian Roman calendar, it will be well to list the questions which may properly be asked of the evidence, with regard to the calendar as a time-measuring instrument. One needs to know (1) the names and lengths of the months, (2) the length of the year, ordinary and intercalary, (3) the method of intercalations, (4) occasions of intercalations, (5) the beginning of the year, (6) the date of the inception of the calendar and its subsequent history. Some of these questions can be answered fully, some in part, and some not at all satisfactorily.

Names and Lengths of the Months

The month names are those listed above (p. 154) before the change of two months in honor of Caesar and Augustus. Of these 12 months, four had 31 days – *Martius, Maius, Quintilis,* and *October* – *Februarius* had 28 days, and the remaining months – *Januarius, Aprilis, Junius, Sextilis, September, November,* and *December* – had 29 days each. The sources are reasonably clear about these names and lengths,[1] and *Fasti Antiates Maiores,* the only pre-julian Fasti, confirm the literary testimonia insofar as any exists. These month names and lengths presumably remained constant from the institution of the republican calendar (see below, pp. 165f.) and, insofar as we can see, the months roughly corresponded to the julian equivalents, although as we will see in the discussion of intercalation (below, pp. 160ff.), irregularities of intercalation make it impossible to set up equivalences for most of Roman history, and at times the republican months were much offset from the julian months of the same names.

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[1] *Inter alia,* Macrobius *Sat.* I, 13, 6–7; Solinus, 1, 38, explaining the change from the earlier ten month year, says that in adding two months, the six months which had previously had 30 days were reduced by one day each, (leaving the four 31 day months) so that, with the necessary days to make the new calendar, plus the subtracted days, two new months, one of 29 and the other of 28, were created. Censorinus, *De die nat.* 20, 2–5, is more explicit: he lists the 30 day months with the 31, as *Martius XXXI, Aprilis XXX, Maius XXXI, Iunius XXX, Quintilis XXXI, Sextilis et September tricenos, October XXXI, November et December tricenos* and, discussing the calendar change to add two months, reporting that a day was subtracted from *sex illis cavis* (30 day) *mensibus,* and that in the construction of the two additional months, the result was *Ianuarius undetriginta dierum, Februarius duotriginta.* For discussions of these and the following matters, see the relevant sections of: Mommsen, *Römische Chronologie,* Ginzel, II, Michels, *Calendar of the Roman Republic,* as well as the Commentarii Generales, I, De Romanorum Anno, in Manni, *Inscr. Ital,* XIII, 2, and the summary in Bickerman, *Chronology* 1968.

Length of the Year

Adding up the totals of days in the months thus given, we have 355 days in the ordinary year ([7 × 29] + [4 × 31] + 28). So far the sources are in agreement.[1] The intercalary month, which was inserted into Februarius (see below, p. 160) had 27 days (including the remaining days of Februarius) according to *Fasti Antiates Maiores*, but Censorinus 20, 6 and Macrobius, *Sat.* I, 13, 12 agree in a statement that in alternate years 22 and 23 days were intercalated, which would make the intercalary month alternately 27 and 28 days. If Michels' argument that indeed the intercalary month was always 27 days, but that it began one day later when it was desired to add 23 days instead of 22 to the year is correct (see below, Method of Intercalation), we then come to a total for an intercalary year of either 377 or 378 days.

It is quite clear from this evidence that the republican calendar attempted to approximate the tropical year. Biennial intercalation of 22/23 days seems clearly an attempt to arrive at a length close to 365¼ days. If, however, the strict alternation of 22 and 23 were followed, the Roman year would be slightly longer than the true tropical year of the seasons. In four years, the tropical year is quite close to 1461 days, while in that same period, the Roman year with this sort of intercalation would be 1465 days ([355 × 4] + 22 + 23). Even if the intercalation never was of 23 days, the basic figure of 22 days of intercalation would produce an excess of three days every four years, an error which would certainly call for correction. Nevertheless, the information we have about the length of the year makes it quite clear that an approximation to the tropical year was desired. It also seems clear that despite the fact that 355 days is close to a lunar year, and although the sources seem to impute a lunar character of some sort to the months,[2] in the historical and even pre-historical period of the Roman calendar, there was no attempt to keep the months to any phase of the moon. It is hardly likely that the alternation of 31 and 29 day months was based on the moon, as experience would show that arbitrary alternations of 29/30 days would do a better job, and furthermore, as indications are for 30/31 day months in a ten month year for earlier times (see below, p. 167), it would seem that the lunar character, which probably existed in the remotest antiquity, had been lost before the period of any of the calendar characteristics of our sources. The Roman year, and certainly that of the republican calendar, aimed at coincidence in length with the seasons.

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[1] E.g., Solinus 1, 39; Censorinus 20, 4; for those sources which report 354 days, see below, p. 161, in the discussion of intercalation. Censorinus, *ibid.* notes that 354 are sufficient for 12 lunar months.

[2] The Roman terminology, Kalends and Ides, corresponds to the beginning and middle of the month and suggests an inheritance from a period in which the months were truly lunar. The explanation of terminology by Macrobius, *Sat.* I, 15, 9–13, describing observances on these days, not only mentions the observation of the crescent by a *pontifex minor*, but writes generally in terms in which he seems to be thinking of a truly lunar month. Indeed, Macrobius, *Sat.* I, 13, 1, crediting the 354 day year with 12 months to Numa, *quibus duodecim lunae cursus confici credidit* is certainly thinking of the republican year as lunar, and Lydus, *De mensibus* III, 4, (Bekker) specifically says the months were lunar until Caesar. The nature of intercalation, 22/23 days, seems to abandon any attempt at lunar months, and suggests that the attempt was to even out the year of 12 months (due in origin to a lunar calendar long abandoned) to the closest average to the seasonal year. That is, while a luni-solar calendar, holding to the lunar nature of the months, must fluctuate between c. 354/384 days, the Romans, without abandoning the traditional months or even their lengths, abandoned any attempt to follow the phases of the moon with them, and tried to hold to an average year. While Greek calendars might fluctuate, and allow two years

Method of Intercalation

There is certainly no doubt that the intercalary month was inserted in the course of the last days of February, and modern scholarship has been concerned with the identification of the precise day in February which the intercalary month followed and with the length of that intercalary month.[1] That they followed the Terminalia, which came on *a.d. VII Kal. Mart.* (February 23) in non-intercalary years is clear, and the difficulty of determining the precise date is best illustrated by two passages of Livy; XLIII, 11.13: *hoc anno intercalatum est; tertio die post Terminalia kalendae intercalariae fuere*; XLV, 44.3: *Intercalatum eo anno; postridie Terminalia kal. intercalariae fuerunt.* The second of these items states that intercalation began the day after February 23, while the first dates the beginning of the intercalarary month to the day after that, February 24 (by Roman inclusive count). While much of the evidence supports the statement in the second passage for the 23rd as the last day before intercalation,[2] there is enough support for the 24th to make the issue a real one.[3] Michels has resolved the problem

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in succession to pass without intercalation, the Roman plan was to minimize error to ± 11 days.

[1] For a complete presentation of the ancient texts dealing with intercalation, along with discussion and analysis of these and modern discussions, see Michels, *Calendar of the Roman Republic*, Appendix 1, pp. 145f.

[2] Censorinus, *De die nat.* 20, 6 states that the intercalation was alternately 22 or 23 days *inter terminalia* (Feb. 23) *et regifugium* (Feb. 24). Varro, *De ling. Lat.* VI, 13, is explicit in calling the Terminalia the last day, adding that when there is an intercalary month, the last five days of February are subtracted. Macrobius, *Sat.* I, 13,6 concurs in the alternation of 22/23 days, and in *Sat.* I, 13, 15, that *post vicesimum et tertium diem ... Terminalibus ...* came the intercalation, with the last five days of February reserved for after the intercalary month. Modern scholars have concluded from these statements that the intercalary month always followed directly upon February 23, that, as said, alternately 22 or 23 days were intercalated, and that the last five days of February followed these to produce months of 27 or 28 days in intercalation. The designation of the date, of course, contradicts Livy's first statement, and the length of the intercalary month contradicts *Ant. Mai.*, which gives 27 days as the length of the intercalary month.

[3] Plutarch, *Numa* 18, discussing intercalation, states that it was of 22 days. If this is to be reconciled with the statement that there was now 22, now 23 days of intercalation, we are forced to accept the statement of Livy as the explanation, i.e., 22 days were intercalated, added to the last 5 days of February to make 27 (*sic Ant. Mai.*) but that when an *effective* intercalation of 23 days was desired, February was allowed to continue through the 24th. Of course, in the circumstances in which February was allowed to continue through the 24th, it is not the last five, but the last *four*

in a solution which seems to me the most reasonable and economical hypothesis in the present state of the evidence: "The simplest interpretation of these assorted bits of evidence is that the intercalary month always had 27 days, but when it was desirable to add 23 days, instead of 22, February was allowed to continue through the 24th, instead of stopping on the 23rd."[1]

The first of the passages of Livy quoted above has in the past also been taken as evidence for the intercalation of single days in the republican calendar, particularly when taken together with statements of Macrobius[2] and Dio[3] that because of superstition the Romans might intercalate a single day to avoid concurrence of the first of the year with the nundinae. The discussion has been of long standing and is voluminous,[4] but in general, basing itself as it does on scanty evidence which may reasonably be interpreted without the introduction of a theory of intercalation of single days before Caesar,[5] I am inclined to follow Michels[6] in the judgement that

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which are subtracted. Michels, *op.cit.* p. 162, explains the statements of later writers as confusion, perhaps following Varro, who, she suggests, explaining Terminalia as the last day, did not bother to note the exception. It is worth noting how the confusion can arise from the Roman system. The last days of February, four or five, are not only subtracted, they are gone forever. In the system they are never identified in the intercalary month. According to the view taken here, the 23rd or 24th would be *pridie Kal. Interk.*, the beginning of the intercalary month would be *Kal. Interk.*, and the month, a constant 27 days, would run on to *pridie Kal. Mart.* What the Romans were aware of, and what later writers followed, is that in intercalary years, 22 or 23 days were intercalary, and that February was broken off. Livy, of course, knew the alternation in the breakoff point, but later writers, seduced by the interruption of February, failed to note that the intercalary month was a full month (which we know to be true) and that February was not "interrupted", but ended, trying thus to represent the 22/23 days as the intercalary month. Mommsen (*Röm. Chron.* 18–25) proposed this scheme earlier, arguing that in this arrangement, when the intercalary month began after February 24, the Regifugium was celebrated on February 24, not in the intercalary month. But Michels (*op.cit.*) has pointed out that in *Ant. Mai.* the Regifugium is listed in the intercalary month, as *a.d. VI Kal. Mart*, and that this is supported by Livy's terminology in saying *tertio die post Terminalia* rather than *postridie regifugium*, which would have been the natural expression had the Regifugium been celebrated on February 24. Michels argues that the Regifugium was celebrated on February 24 in a non-intercalary year, and on intercalary 23, thus always *a.d. VI Kal. Mart.*, and that this terminology is the natural source of the identification of the last days of the intercalary month with the lost days of February.

[1] Michels, *op.cit.* p. 161. It is worth noting that Plutarch, *Numa* 18, *Caesar* 59, gives the name Mercedonius to the intercalary month, but this must have been an unofficial name, as it is unattested in the official lists (cf. Michels, *Calendar*, p. 18).

[2] *Sat.* I, 13, 16–19: In order that the first day of the year might not fall on the nundinae, or nundinae with the nones another day (*dies ille quo abundare annum diximus*, i.e., the 355th day, which exceeds a proper lunar year by one day) could be inserted *in medio Terminaliorum vel mensis intercalaris.*

[3] XL, 47, 1–2, reports omens at the time of the unlucky coincidence of the nundinae and the first of January in 52 B.C.; XLVIII, 33, 4: in 41 B.C. (after the introduction of the julian calendar) there was an embolimos day to avoid that coincidence, which had been avoided from the most ancient times, and that this day must have been subtracted, in order not to throw the julian calendar off.

[4] See the resume of the discussion in Ginzel II, p. 245f., and Ideler II, p. 62–64 for the statement of the position arguing for the intercalary day.

[5] Livy's statement can be taken as evidence for the continuation of February through the 24th, as above. Macrobius' comment is rather an argument against the intercalary day: his first mention of the intercalary day is in connection with the Lepidianus tumultus in 78 B.C.,

the Romans did not intercalate single days before the new calendar promulgated by Caesar.

Occasions of Intercalation

There seems to me to be little doubt that intercalation in the republican calendar was irregular, following no predictable pattern. Apart entirely from occasions when, it is charged, the pontifices' manipulation upset the calendar,[1] there is evidence for discrepancies between the calendar and the solar year and for occasions of uncertainty about intercalation. In general, we know little about the years which were intercalary. Of recent scholars, both Bickerman[2] and Michels[3] concur in this negative conclusion, and although there have been many discussions of all the evidence, the major testimonia support the view convincingly. We have already seen (above, p. 157) that at the time of the institution of the julian calendar, the calendar of the republic was so at variance with the seasons that it was necessary to insert 90 days to permit the new calendar to begin with the seasonal relationship established anew. As it is impossible here to cite all the evidence which proves the negative conclusion for earlier years, I shall be content to sketch the situation referring only to the major items of evidence.[4]

The information we have about the chronology of campaigns suggests that the calendar ran more or less concurrently with the tropical year in the last quarter of the second and first quarter of the first centuries. According to Plutarch (*Pomp.*34), Pompey's Albanian campaign began in winter, at the time of the Saturnalia, and as these fall in late December of the Roman calendar, we may take it that in 66 B.C., the year of the campaign, the Roman calendar was in rough accord with the tropical year *if the Saturnalia fell in winter as Plutarch says.*[5] Earlier, during the Jugurthine War

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and in that year the coincidence occured – there was no intercalation in a year in which according to the theory there should have been. Further, the 355th day of Macrobius is not extra, since, according to his own account of month lengths, (*Sat.* I, 13, 6–7) the ordinary year added up to 355 days (see above, p. 158, n. 1). Dio's statement that the concurrence had long been avoided is contradicted by this passage of Macrobius, as well as his own account of 52 B.C. For Macrobius' peculiar Latin, that the day is inserted *in medio Terminaliorum*, cf. Michels, *Calendar* p. 166, and cf. there also, page 165, Michels pointing out that the possibility of avoiding the coincidence by shifting the nundinae is confirmed by Dio LX, 24, 7, stating that in 44 B.C. the nundinae were transferred to another day because of religious ceremonies.

[6] *Calendar*, pp. 164–167.

[1] E.g., Cicero, *De leg.* II, 29 (negligence); Suetonius, *Caes.* 40 (impropriety); Solinus 1, 43 (corruption); Censorinus *De die nat.* 20, 7 (politics) all making general charges of pontifical manipulation.

[2] *Chronology* 1968, p. 46.

[3] *Calendar*, p. 170.

[4] A summary of the evidence (more optimistic than mine) may be found in Ginzel II, pp. 268–273, based primarily on L. Holzapfel, *Römische Chronologie*, Leipzig, 1885, and for the later republic, P. Groebe, *Der Römische Kalender in den Jahren 65–43 v. Chr.*, Leipzig, 1906. For reasons which will appear below (n 5, p. 163, n. 1) I am dubious about the relevance of all the evidence used.

[5] That is, if Plutarch had evidence that in this year the Saturnalia really fell in the winter, rather than obtained the equation with winter by his knowledge that (in the calendar he knew) the Saturnalia fell in winter. A similar kind of weakness in the evidence, again from

in 109 B.C., January fell in the winter according to Sallust, *Jug.* 37, 3, suggesting that then too the calendar was in accord with the seasons; as too, Appian's statement in *Pun.* 99, that at the time of the rising of Sirius (i.e., 27 July) sickness fell on the camp before Carthage in 149 B.C. and that soon after Censorinus the consul went to Rome to conduct the elections, would mean that the calendar was in at least rough accord with the seasons if: the year began in January, elections were held in November, so that Censorinus may be taken to have left the army in September to arrive in Rome in October.[1]

If, however, the calendar worked properly from ca. 70–150 B.C., there is solid evidence that it was not working in 168 B.C. For that year, Livy XLIV, 37, 38 reports an eclipse before the Battle of Pydna to have taken place on *a.d. III Non. Sept.* (3 September); but that eclipse is known to have occured on 21 June, so that the calendar was awry by about 2½ months. This would seem to me conclusive,[2] as does also the calendar-eclipse equation for 190 B.C., in which year Livy XXXVII, 4, 4 records that the eclipse (of 14 March, by modern calculation) fell on *a.d. V Id. Quinct.*, that is, July 11 in Roman reckoning, so that the seasonal discrepancy which had been ca. 2½ months in 168 was a few decades earlier almost four months. One may speculate that there had been extra intercalation after 190 to reduce the error so that it was smaller by 168 B.C.

Earlier, the evidence is fragmentary and uncertain. The total eclipse of the sun referred to by Livy XXII, 1, 8, (11 February 217 B.C.) shortly after the statement that the consul entered office on the Ides of March, has been taken to attest a discrepancy of about a month with the seasonal year. For years before this, the evidence seems to me to be so scanty or of such uncertain meaning that despite proposals for resolution (cf. Ginzel II, pp. 269 ff. and references there) I propose to leave the matter of the accord between seasons and the calendar completely open. The date of any event must be argued from the evidence bearing on the event itself, not from any resolution of the calendar problems. Michels[3] has presented the following years as intercalary: 260, 236, 189, 177, 170, 167, 166, 164(?), 83, 52, 46, with some suggestions about indications which may argue for intercalation in other years, but the years are so few as to make impossible any calculation of equivalences, even in the years which are themselves intercalary. When, as we have seen, the year may be as much

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Plutarch, is in *Marius* 26, where the Battle of Vercellae in 101 B.C. is dated μετὰ τροπὰς Θέρους . . . πρὸ τριῶν ἡμερῶν τῆς νουμηνίας τοῦ νῦν μὲν Αὐγούστου, τότε δὲ Σεξτίλου μηνός. Did Plutarch extrapolate the season from his knowledge of the calendar and the precise date in his sources? As I have said in my discussion of Greek calendars (above, p. 68), with Plutarch and others one must be cautious about accepting the antiquity and accuracy of both sides of a calendar equation.

[1] This item illustrates how mushy the evidence really is. Any of the assumptions may be slightly in error, and the evidence proves, at best, that the calendar *could have been* in accord with the seasons. But Bickerman, *Chronology* 1968, also accepts a correct calendar for this (ca. 140–70 B.C.) period, and I know of nothing to disprove it.

[2] The date disputed by Oost, *ClPhil.* 48, 1953, pp. 217–230, is defended by Broughton, *Mag. Rom. Rep.* Suppl., p. 48 as based on annals, and is accepted by both Bickerman, *Chronology* 1968, p. 46, and Michels, *Calendar* p. 103.

[3] *Calendar*, p. 171–172, with the evidence for the individual intercalary year.

as four months at variance with the seasons (190) and that almost two of these months can be eliminated within about 20 years (168), and when 90 days of error could accumulate between 66 and 46 B.C., it is not safe to give a julian date to any date in the Roman republican calendar unless there is a fixed point in the Roman calendar very near to that date, and even then the julian date can be only approximate.

It is worth noting that, inconvenient as this irregular intercalation may seem to have been for a time-reckoning system, it remained in use until the Caesarian calendar was instituted, and there is specific evidence of the kind of uncertainty which it caused. Cicero, *Att.* V, 9, 2 and V, 13, 3 is in doubt about whether the year is intercalary, and in *Att.* V, 21, 14, written on *Id. Febr.*, still did not know whether that year was to be intercalary – an intercalation which was to occur or not only 10 days later.[1] There is little reason to hope, from very limited sources, to know more about the past of the Roman calendar than Cicero could know of its present.[2]

The Beginning of the Year

Although the names of the latter months in the year suggest that the beginning of the year in the pre-republican calendar (see below, p. 167) began in March, the status of the calendar with the initial month of January must have preceded the julian reform,[3] since the fasti in the republican *Antiates Maiores* shows January as the first month. Michels believes that the republican calendar always began in January,[4] and various items of evidence confirm this. Plutarch clearly believed that the calendar with January as the first month had the greatest antiquity since he credited that order of the months to Numa at the change from the 10 month year.[5] Lydus, who may only be repeating Plutarch, obviously believed him,[1] and Ovid, *Fasti* II, 47–54, although allowing that February had anciently been the last month, and was put after January by the decemvirs, is quite insistant that January was first from very early times. Macrobius too, *Sat.* I, 13, 3, credits to Numa the institution of January as first month. Although there is testimony that February was the last month (as Ovid admitted) in early times,[2] I am rather more inclined to believe that the self evident nature of the earliest year – i.e., of ten months, since the last months had numbers ending with the tenth – induced people to believe that March began the year so that the numerals would be right (see below, p. 167) and that this, combined with the presence of the Terminalia in February, prompted the belief that February must have been the last month. And this in turn raised the confusion reflected in Plutarch, with the suggestion that Numa might have just *rearranged* the months, and such a basis may be proposed for the peculiar explanation of Ovid. Since it is easy to see how the terminal February could have been created, and rather more difficult to understand how a tradition of the ancient position of January as first month could have arisen, I have more confidence in the Plutarchian view, particularly since any opposing evidence, e.g. Varro, rather points to February as the last month, not specificically denying the primacy of January in every case.

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[1] It is worth noting Dessau, *Inscr. Lat. Sel.* 6302 = Degrassi, *Inscr. Lat. Lib. Rep.* 719, in which 14 February is called *a.d. X Terminalia* showing that there was doubt on the 14th about intercalation, so that it was necessary to use the Terminalia as a date peg.

[2] There is the theory of Macrobius, *Sat.* I, 13, 13, that in a cycle of 24 years, during the third octennium the Roman intercalated only 66 days instead of 90, compensating by the omission of 24 days the excess over the proper tropical year which the Roman biennial system, if maintained, would have created (see above, p. 159). But there is no other hint of such a cycle, and the evidence of irregularity in intercalation supports the view that the approximation to the tropical year was obtained not by cyclical but by *ad hoc methods*. Michels, *Calendar*, p. 169, may well be right in explaining Macrobius' statement as generated by a theorist speculating on how the Roman system might be adjusted to work properly.

[3] See above, pp. 154f.

[4] *Calendar*, pp. 97–99, arguing, *inter alia*, that the fact that in 153 B.C. the consuls entered office on the Kalends of January did not signify a change in New Years day, as they had entered office previously on a variety of days. (Cf. Broughton, *Mag. Rom. Rep.* II, pp. 637–639). For a brief discussion, and summary of the opinions, see Michels, *loc. cit.* or Ginzel II, pp. 226–229.

[5] *Numa* 18–19: Although reflecting disagreement in the tradition, whether Numa *changed* the order of the months to make January the first, or *added* to make January the first (Plutarch, *Numa* 19 allows that the original calendar must have had only ten months) he is quite clear that the primacy of January dated to Numa, and the view is repeated in *Quaest. Rom.* 19 (*Mor.* 268 C). Plutarch's view can be explained only by a tradition that the change to January had very great antiquity.

Whether or not the view that the republican calendar always began with January is correct, there seems to me to be little doubt that the first month had been January long before the first century B.C. The sources which date it credit it to Numa. As Michels has pointed out,[3] the probability is that in the fasti of Fulvius Nobilior (cos. 189) the year began with January. In any case, all the treatments or February as the last month treat of the matter in their terminlogy as if the discussion referred to a situation of very great antiquity.

Inception of the Calendar

Roman tradition seems to me to be almost consistent in crediting Numa with a major calendar reform. Plutarch, *Numa* 18, discussing the change from the earlier calendar, attributes to Numa all the major characteristics of the republican calendar: a year of 354 days (*vice* 355); the intercalation of 22 days in February, and a change in the order (or number) of months so that January and February became the first two months. Plutarch's account lacks some details, but these are supplied, with some discussion of the initator, by Censorinus, *De die nat.* 20, 4: *Postea sive a Numa, ut ait Fulvius, sive, ut Iunius, a Tarquinio XII facti menses et dies CCCLV*, with a following fuller discussion of the organization of the year (see above, p. 158), and by Macrobius, *Sat.* I, 13, 1–7. While some details, particularly intercalation, are seen by some sources as belonging to the subsequent history of the calendar, the antiquity of the system is assumed by all. Indeed, the republican calender may well go back to the period of the kings and the sixth century, although the first solid evidence for the existence of this calendar cannot be found until the end of the fifth century or beginning of the fourth. Cicero, *De re publ.* I, 25, mentions that Ennius and the *annales maximi* report an eclipse of the sun in *ca.* a.u.c. 350 (= ca. 401 B.C.) on the *nones* of June. The eclipse may be that of 21 June 400, but, what is noteworthy is the statement that the eclipse of the sun – which in a lunar month would take place at conjunction, i.e., before the kalends – took place on the fifth, thus suggesting that the calendar in effect at the time was not lunar, and was in all probability the republican calendar which by its very nature had abandoned co-ordination with the lunar month. Michels put forward this view,[1] along with the suggestion that the introduction of the republican calendar may be associated with the decemviri of 450 B.C., who are credited with introducing a bill concerning intercalation.[2]

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[1] *De mens.* I, 16 (p. 9 Bekker) and IV, 1 (p. 50 Bekker).

[2] Varro, *De ling. Lat.* VI, 13, pointing to the Terminalia as the last day of the year, with February the 12th month; Cicero, *De leg.* II, 21, 54, stating his view that February was anciently the last month, following December; Festus, s.v. Februarius. It is worth noting that this evidence is unspecific as to time, and may be referred to the pre-republican calendar. Varro, however, does seem to reflect the development from the 10–12 month year, *De ling. Lat.* 33–34, but even in his comment that January and February were added to the year he seems to imply that January was the first month, and he may, in his comment about the Terminalia, be following the view that February was the last month, without prejudicing the position of January as the first.

[3] *Calendar*, p. 98, and n. 15.

Whatever the precise date may be, the introduction of the pre-julian calendar was certainly early, and the scant information we have about its history suggests that there were a number of attempts to deal with problems generated by it. We are told of legislation dealing with the calendar, and the legislative activity deals not only with the religious aspect of the days in the calendar, a matter not examined here, but also with the actual operation of the calendar as a chronological tool.

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[1] *Calendar*, pp. 121–130. Michels discusses the evidence at some length, dealing with evidence of change in the calendar to arrive at the suggestion of 450 B.C. for its institution. She suggests that the Roman traditions about Numa were responsible not only for attribution of calendar invention to him along with ascribing the choice of odd numbers to his Pythagorean interests, but also that much of the development of the calendar was lost from their recollection in attributing so much to Numa.

[2] *Sat.* I, 13, 21, *Tuditanus refert libro tertio Magistratum decem viros, qui decem tabulis duas addiderunt, de intercalando populum rogasse. Cassius eosdem scribit auctores.* But Macrobius, in the further discussion in this passage points out Varro's argument that a law dated before the decemviri was dated in an intercalary month. As Michels points out (*op.cit.* p. 127), that law could have been dated in an intercalary month in a pre pre-julian calendar, and so the law of the decemviri could have been introducing a new calendar, i.e., the republican pre-julian calendar with a new type of intercalation.

Macrobius here was concerned with the beginning of intercalation, and of course, if I am right (below, p. 168) that the Roman calendar had from the beginning some form of intercalary month as did the Greek system, then there ought to have been no record of the introduction of intercalation, and every law so credited must have been a modification, or should be understood (if it really did affect intercalation) as evidence of a tradition of a new form or a different form of intercalation. One other support for designating the decemviri as the initiators of the new calendar may be the passage of Ovid, *Fasti* II, 47–54, stating that the decemviri rearranged the year, putting January first and February last. This comment whatever it really means (see above, p. 165) may point to a tradition which held the decemviri as the introducers of the new calendar.

It is impossible, however, to make any real analysis of the development of the calendar as a chronological tool. Roman tradition is exceedingly confused on these matters, as for example, discussions of intercalation in he ancient sources themselves admit to disagreement among their sources. Macrobius, investigating the invention of intercalation in *Sat.* I, 13, 20–21, reports the following attributions: to Numa Pompilius by Antias; Servius Tullius by Junius; the decemviri, credited by Tuditanus with a law about intercalation, with its invention by Cassius, while by Fulvius, there is the statement *id egisse M. Acilium* consul 191 B.C., which Macrobius understands to mean that Acilius invented intercalation. The information that credits invention as late as 191 B.C. can surely not be correct, and probably, as Michels suggests,[1] the lex Acilia of 191 B.C. was involved, not as Macrobius thought with inventing intercalation, but adjusting it, as indeed the vague reference to the action of the decemviri of the 5 th century, who *de intercalando populum rogasse*, ought not to refer to inventing intercalation but at most would refer to the introduction of a new calendar with a different kind of intercalation.

I suggest, therefore, that the adjustment of intercalation in the julian calendar carried out by Augustus (above, p. 156) is the best analogy for the lex Acilia, and that the history of the calendar from its institution to its abolition by Caesar was a history of change only in the status of days[2] or of adjustments in intercalation, and that the month names, orders, and lengths remained constant, while intercalation, which went awry for various reasons (above, p. 162), might be occasionally subject to legislative adjustment.

4. *The Ten Month Year*

It would seem apparent from the very names of the months at the end of the year Quintilis to December with no numbered month after December, that the Roman calender originally had only ten months.[3] This was the view of Censorinus,[4] citing Junius Gracchus, Fulvius Nobilior, Varro, and Suetonius, against the testimony of Licinius Macer and Fenestella, who stated that the year had always been of 12 months. Macrobius also subscribed to the position of a ten month year,[5] as did Solinus,[6] and other writers. The consensus also seems to be that the original year was of 304 days in length, began in March, with six months, April, June, Sextilis, September, November and December of 30 days, and four months, March, May, Quintilis, and

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[1] *Calendar*, pp. 101–103.

[2] For an examination of the history of the feriale, see *Michels, Calendar*, pp. 93–118.

[3] Even if there is some historicity in the peculiar statement by Ovid, *Fasti* II, 47–54, that February was the last month but inserted after January by the Decemviri and it is not a fiction to explain the feriale (see above p. 165), the original names of the months still suggest an original ten month year.

[4] *De die nat.* 20, 2; cf. 20, 3; 22, 9–10.

[5] *Sat.* I, 12, 3.

[6] Ed. Mommsen, 1, 35 and 36.

October of 31 days.[1] The only variation from this uniform picture of the very early Roman calendar comes from Plutarch in his discussion of the calendar reform of Numa,[2] reporting that the calendar of Romulus had very irregular months, varying from fewer than 20 to 35 or more days in a year of 360 days. Even Plutarch acknowledges the view that the calendar had 10 months originally; discussing the change of months by Numa to bring January and February to first and second positions, he ends up in *Numa* 19 subscribing to the view that the original year had 10 months, using the etymological argument from the month names as proof.

It seems to me to be safe to accept the view that there was a 10 month calendar before there was a 12 month one. It would also seem likely that one may trust the traditions that a 10 month calendar of 304 days (with month lengths as mentioned above) did exist, although there may stand the question of whether that 10 month calendar always had 304 days. The ancient sources seem to reflect a tradition that the introduction of the 12 month calendar came at the same time as the expansion of the calendar year to 355 days, but except for an interesting notice by Lydus, there seems to be no hint of development in the calendar which preceded the republican 12 month calendar.

In *De mensibus* I, 16, Lydus reports that from the time of Kronos until the founding of Rome the year was maintained in accord with the course of the moon, but that Romulus made the year ten months in length, with some months getting fewer than 30 days, and some more. This is the testimony to the original nature of the Roman year as lunar in a true lunar calendar, which has fallen out of the general tradition.[3] Lydus' view seems to assume that the change from true lunar months was made by Romulus' ten month calendar, and certainly if the months were more than 30 days, that calendar must have differed from the phases of the moon.

I suggest that the evidence may be reconciled to give a reasonable and coherent picture of calendar development within which context all the information may be fitted. The initial calendar, as we should expect, was truly lunar (Lydus) probably regulated by observation. At some time subsequent, the Romans, having already established a primitive feriale, shifted from a lunar calendar to one which fitted more closely the seasonal year. Moving from the earlier calendar in which there were ten named months, a ten month calender was established, and meeting the needs of the feriale, the lengths of those months were set as reported by Censorinus *et al.* (above,

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[1] Aulus Gellius, *Noct. Att.* III, 16, 16, attests the 10 month year. So too Servius, ad. Verg. *Georg.* I, 43, with the additional note that the year began in March, and also Ovid, *Fasti* I, 27, and in III, 119, reporting that a year was over when the moon returned for the tenth time to full moon, thus indicating the lunar nature of that year.

[2] Plutarch, *Numa* 18, 1. Ginzel II, p. 223, relates the statement by Plutarch of the variant month lengths to the testimony of Censorinus, *De die nat.* 22, 6, attributing widely different month lengths: *Apud Albanos Martius est sex et triginta, Maius viginti et duum, Sextilis duodeviginti, September sedecim*; *Tuscalanorum Quintilis dies habet XXXVI, October XXXII, idem October apud Aricinos XXXVIII.* I suppose that Plutarch, in his comment, must reflect some awareness of radically different month lengths in Italy in the remote past.

[3] Noted by Michels, *Calendar* p. 123.

p. 158, note 1). This made a total of 304 days as reported, and the calendar was constructed to occupy the important period of the year from beginning of spring to the end of fall. However, in order to keep the year in accord with the seasons, it was necessary to fill that year to an approximation of the tropical year, and therefore, the ten months were supplemented by enough days to bring this total to 360 days. This explains Plutarch's stressing of the attempt to keep the year at 360 days, and accommodates all the evidence except Plutarch's remark that the month could range from fewer than 20 days to 35+ days. That comment may be explained as based either on information about different month lengths in Italy, such as months mentioned by Censorinus (above, p. 168 note 2) or it may be based on testimonia about the treatment of the supplemental 56 days, which brought the 304 days to a total of 360. Those days may have been inserted in irregular periods, and if the beginning of the ten month year was tied to some astronomical phenomenenon like the spring equinox, those periods might be most irregular, being lengthened or terminated as the equinox was observed.[1]

This is of course all highly speculative and cannot be regarded as more than a suggestion of the direction in which interpretation of the evidence might go. I do not think that the evidence permits a firmer statement.[2] Nor do I believe that it is possible to state with any confidence at all when any of the stages of any development, or any system at all in the early period, were actually introduced in Rome, although the literature is replete with attempts to do just this.[3]

The first month of the ten month year was Martius, as all the sources tell us.[4] The julian equivalent of that Martius is of course nowhere attested, although the later place of Martius would suggest that the month began with some phenomenon associated with the spring equinox, or with the equinox itself. There is no evidence at all that intercalation was ever practiced in connection with the ten month year,[5] and if

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[1] For the possibility of this kind of observation, cf. above, p. 23, on observation of the solstices. I suggest the spring equinox, as the 10 month year began in March.

[2] I should note that this is a statement much in accord with the view taken by Bickerman, *Chronology* 1968, p. 44, that the year of Romulus was a purely agricultural year, like many primitive years, taking account of only the period of agricultural activity, neglecting the rest of the year and dividing the year from one spring to the next "into fractions of irregular length." Bickerman accepts the irregular months attested as reflecting such a year, and I have here simply expanded what seems to me a reasonable position into stages which seem to me attested. That is, the agricultural year was first truly lunar, then those months were adapted to the seasonal year by insertion of extra days, and the month lengths were fixed while the extra days were made into the "fractions of irregular length."

[3] For a most useful summary of this, see Michels, *Calendar*, Appendix 4, pp. 207–220.

[4] For the testimonia, see above, p. 164, to which should be added Plutarch, *Numa* 18, 3. March as first month is implied by the fact that the year was ten months in length.

[5] The discussions of the beginning of intercalation, based on the Roman problems of determining it, and discussed above p. 160 and by Michels, *Calendar*, *passim*, which indicate that Roman tradition was at variance on this matter, may be explained by this. If I am near the truth in my suggestion about the development of the early calendar, there may have been intercalations of months in the earliest, lunar calendar, but not in the ten month calendar, so that tradition about the earliest period might have been conflicting. Or, if there

I am right in my guess that the year was adjusted to the seasons by insertion of days between the end of the last month and the beginning of the first, we do not have any true intercalation needed.

was no intercalation in the lunar calendar, the insertion of the extra days in the 10 month calendar might have been reported by some sources, but not others, as intercalation.

CHAPTER VI

CALENDARS OF THE EASTERN ROMAN PROVINCES

Before the eastern Mediterranean came under the control of Rome, the several Hellenistic kingdoms and cities operated under a number of calendaric systems. The Ptolemaio-Egyptian and the Seleucid calendars served many areas; individual cities maintained their own calendars; in old Greece, the multitude of city-state calendars continued until and even after the Roman conquest. But once the julian reform had taken effect to create a calendar of obvious advantages, the Roman influence was felt strongly throughout the East.

Although the Roman calendar did not sweep away local systems of reckoning time everywhere, it did supplant many of the former calendars. By the first century of our era, many cities in the East were using adaptations of the Roman system, even though a significant number of others persisted in older usages. The acceptance of the Roman calendar, even in those cities which used it, was in general limited to adoption of the julian *system*. Local month names endured, assimilated to the months with Roman names in the julian calendar. Our knowledge of these calendars, derivable from a limited number of inscriptions in many cases, from the extensive finds of papyri in the case of Egypt, is broadened by allusions in literary texts, and more significantly, from hemerologia extant in later manuscripts.

1. *The Hemerologia*

The name hemerologion has been given to a certain type of text which lists the sequences of days of the months in a number of different calendars. 'Menologion' might be a better word. A number of such hemerologia exist among the medieval codices, and these have been most fully discussed by Kubitschek in his publication of the more important of them in 1915,[1] the Florence Hemerologion (Med. XXVIII 26), the Leiden Hemerologion (Gr. 78), and the Vatican Hemerologion (Gr. 1291).[2] The

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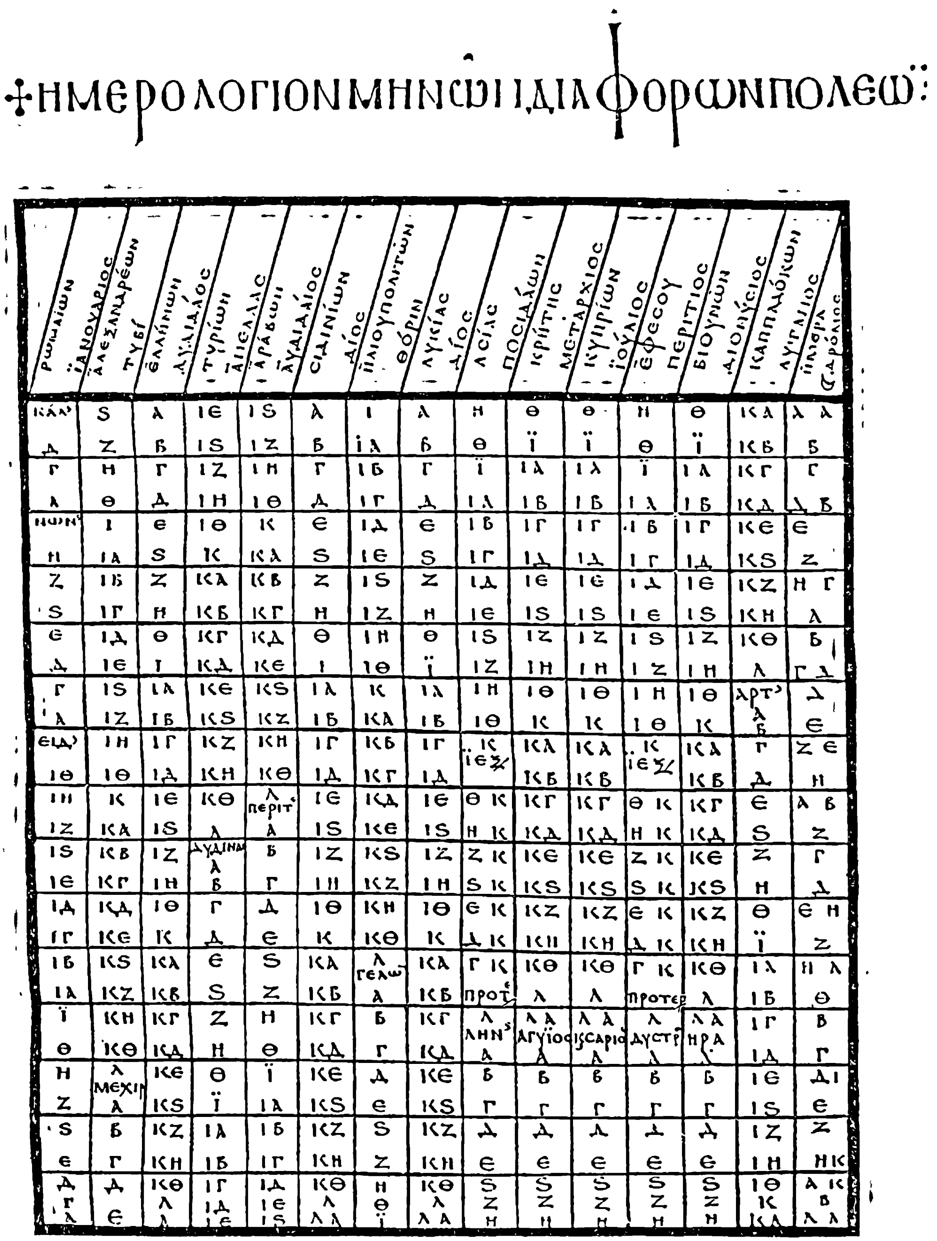
[1] W. Kubitschek, *Die Kalenderbücher von Florenz, Rom und Leyden, Denkschriften der Kaiserl. Akademie der Wissenschaften in Wien, Philosophisch-historische Klasse*, 57, Abhandlung 3, Wien, 1915.

[2] Kubitschek also notes, p. 60, of another



✝ΗΜΕΡΟΛΟΓΙΟΝ ΜΗΝΩΝ ΔΙΑΦΟΡΩΝ ΠΟΛΕΩΝ:

ρωμαίων ἰανουάριος	ἀλεξανδρέων τυβί	ἑλλήνων αὐδιναῖος	τυρίων ἀπελλαῖος	ἀράβων αὐδιναῖος	σιδωνίων δῖος	ἡλιουπολιτῶν θόριν	λυκίας δῖος	ἀσίας ποσιδεῶν	κρήτης μεταρχιος	κυπρίων ἰούλιος	ἐφέσου περίτιος	βιθυνῶν διονύσιος	καππαδόκων αὐγαῖος	ἱπποσρα σαρόλιος
ΚΑΛ Δ	Ϛ Ζ	Α Β	ΙΕ ΙϚ	ΙϚ ΙΖ	Α Β	Ι ΙΑ	Α Β	Η Θ	Θ Ϊ	Θ Ϊ	Η Θ	Θ Ϊ	ΚΑ ΚΒ	Λ Α Β
Γ Α	Η Θ	Γ Δ	ΙΖ ΙΗ	ΙΗ ΙΘ	Γ Δ	ΙΒ ΙΓ	Γ Δ	Ϊ ΙΑ	ΙΑ ΙΒ	ΙΑ ΙΒ	Ϊ ΙΑ	ΙΑ ΙΒ	ΚΓ ΚΔ	Γ Δ Β
ΝΩΝ Η	Ι ΙΑ	Ε Ϛ	ΙΘ Κ	Κ ΚΑ	Ε Ϛ	ΙΔ ΙΕ	Ε Ϛ	ΙΒ ΙΓ	ΙΓ ΙΔ	ΙΓ ΙΔ	ΙΒ ΙΓ	ΙΓ ΙΔ	ΚΕ ΚϚ	Ε Ζ
Ζ Ϛ	ΙΒ ΙΓ	Ζ Η	ΚΑ ΚΒ	ΚΒ ΚΓ	Ζ Η	ΙϚ ΙΖ	Ζ Η	ΙΔ ΙΕ	ΙΕ ΙϚ	ΙΕ ΙϚ	ΙΔ ΙΕ	ΙΕ ΙϚ	ΚΖ ΚΗ	Η Γ Α
Ε Δ	ΙΔ ΙΕ	Θ Ι	ΚΓ ΚΔ	ΚΔ ΚΕ	Θ Ι	ΙΗ ΙΘ	Θ Ϊ	ΙϚ ΙΖ	ΙΖ ΙΗ	ΙΖ ΙΗ	ΙϚ ΙΖ	ΙΖ ΙΗ	ΚΘ Λ	Β Γ Δ
Γ Α	ΙϚ ΙΖ	ΙΑ ΙΒ	ΚΕ ΚϚ	ΚϚ ΚΖ	ΙΑ ΙΒ	Κ ΚΑ	ΙΑ ΙΒ	ΙΗ ΙΘ	ΙΘ Κ	ΙΘ Κ	ΙΗ ΙΘ	ΙΘ Κ	ΑΡΤ Α Β	Δ Ε
ΕΙΔ ΙΘ	ΙΗ ΙΘ	ΙΓ ΙΔ	ΚΖ ΚΗ	ΚΗ ΚΘ	ΙΓ ΙΔ	ΚΒ ΚΓ	ΙΓ ΙΔ	Κ ιεζ	ΚΑ ΚΒ	ΚΑ ΚΒ	Κ ιεζ	ΚΑ ΚΒ	Γ Δ	Ζ Ε Η
ΙΗ ΙΖ	Κ ΚΑ	ΙΕ ΙϚ	ΚΘ Λ	Λ περιτ Α	ΙΕ ΙϚ	ΚΔ ΚΕ	ΙΕ ΙϚ	Θ Κ Η Κ	ΚΓ ΚΔ	ΚΓ ΚΔ	Θ Κ Η Κ	ΚΓ ΚΔ	Ε Ϛ	Α Β Ζ
ΙϚ ΙΕ	ΚΒ ΚΓ	ΙΖ ΙΗ	αὐδιναι Α Β	Β Γ	ΙΖ ΙΗ	ΚϚ ΚΖ	ΙΖ ΙΗ	Ζ Κ Ϛ Κ	ΚΕ ΚϚ	ΚΕ ΚϚ	Ζ Κ Ϛ Κ	ΚΕ ΚϚ	Ζ Η	Γ Δ
ΙΔ ΙΓ	ΚΔ ΚΕ	ΙΘ Κ	Γ Δ	Δ Ε	ΙΘ Κ	ΚΗ ΚΘ	ΙΘ Κ	Ε Κ Δ Κ	ΚΖ ΚΗ	ΚΖ ΚΗ	Ε Κ Δ Κ	ΚΖ ΚΗ	Θ Ϊ	Ε Η Ζ
ΙΒ ΙΑ	ΚϚ ΚΖ	ΚΑ ΚΒ	Ε Ϛ	Ϛ Ζ	ΚΑ ΚΒ	Λ γελω Α	ΚΑ ΚΒ	Γ Κ προτε	ΚΘ Λ	ΚΘ Λ	Γ Κ προτερ	ΚΘ Λ	ΙΑ ΙΒ	Η Α Θ
Ϊ Θ	ΚΗ ΚΘ	ΚΓ ΚΔ	Ζ Η	Η Θ	ΚΓ ΚΔ	Β Γ	ΚΓ ΚΔ	Λ ληνς Α	ΛΑ ἀγυιος Α	ΛΑ ἰσκαριο Α	Λ δυστρ Α	ΛΑ ηρα Α	ΙΓ ΙΔ	Β Γ
Η Ζ	Λ μεχιρ Α	ΚΕ ΚϚ	Θ Ϊ	Ϊ ΙΑ	ΚΕ ΚϚ	Δ Ε	ΚΕ ΚϚ	Β Γ	Β Γ	Β Γ	Β Γ	Β Γ	ΙΕ ΙϚ	ΔΙ Ε
Ϛ Ε	Β Γ	ΚΖ ΚΗ	ΙΑ ΙΒ	ΙΒ ΙΓ	ΚΖ ΚΗ	Ϛ Ζ	ΚΖ ΚΗ	Δ Ε	Δ Ε	Δ Ε	Δ Ε	Δ Ε	ΙΖ ΙΗ	Ζ Η Κ
Δ Γ Α	Δ Ε	ΚΘ Λ Α	ΙΓ ΙΔ ΙΕ	ΙΔ ΙΕ ΙϚ	ΚΘ Λ Α Α	Η Θ Ϊ	ΚΘ Λ Α Α	Ϛ Ζ Η	Ϛ Ζ Η	Ϛ Ζ Η	Ϛ Ζ Η	Ϛ Ζ Η	ΙΘ Κ ΚΑ	Α Κ Β Λ Α

The January Table of The Florentine Manuscript

(Med. XXVIII)

texts are schematic, tabular in format. In each, the left column presents the days of the Roman month, calends, nones, ides. Across the top are listed a number of cities or areas, with each local equivalent month for the Roman month given. To each of these local months is allotted a column, in which is given the day equivalent to the Roman month day. (See figure). Although the manuscripts were actually written in the ninth century and after,[1] Kubitschek concluded, following Boll,[2] that the texts represented an ancient compilation, and Gerstinger-Neugebauer, publishing a fragmentary hemerologion on papyrus,[3] of the year 348 or 424 A.D., agreed "Daß die 'Hemerologien' ('Menologien') sehr alt sein und tief in die römische Kaiserzeit zurück gehen müssen, ist klar." The texts provide, then, invaluable documentation for the calendars of the East during the period of Roman domination.

Since the hemerologia give day-to-day equivalences in the several calendars, we can determine precisely the lengths of the months in each calendar. There are four main schemata for the arrangement of the days in the different assimilations of local calendars to the julian system.[4]

1. Local months co-incipient and coterminous with the julian months.
2. Calendars in which New Year's day is Augustus' birthday, September 23, of which there are two subdivisions:
   a) those which follow julian month lengths, and
   b) those which do not.
3. Calendars without a 28 day month and without epagomenal days, and which arrange the months in several ways to follow the julian year.
4. Calendars with 30 day months followed by epagomenal days.

The listing of days provides in addition to this detailed evidence for the structure of individual months, information for the count of days which is set forth in detail. Although all the tables use numerals the count of days is not always the same. Most of the calendars use a straight forward count, A–I, IA–K, KA–Λ. However, one group of calendars does introduce variation, and the count is forward up to day 20, but for the last ten days in is backwards: day 21 is I ἐξ(ιόντος) and the count thereafter is ΘK, HK, ZK, ϚK, EK, ΔK, ΓK, with the 29th called the προτ(ριακάδα) and the 30th called Λ. All this information made it possible for Kubitschek to draw up a series of calendars for individual locales, and we can, with the aid of inscriptions and papyri, confirm his results to a large measure.

Florentine ms, Med. XXVIII, 12, that it is a later copy of the Leiden text.

[1] Cf. Kubitschek, *op.cit.* pp. 58ff.

[2] *Op.cit.* p. 61.

[3] H. Gerstinger-O. Neugebauer, *Eine Ephemeride für das Jahr* 348 *oder* 424 *n. Chr.*, *Österreichische Akademie der Wissenschaften*, Philosophisch-historische Klasse, Sitzungsberichte 240, Abhandlung 2, Wien, 1962. The papyrus is very similar to the later medieval texts.

[4] Cf. Kubitschek, *op.cit.* pp. 41ff.

Calendars with Months coincident with Julian Months

	Antioch[1] (Common Macedonian)	Seleucia in Pieria[2]	Lycia[3]	Sidon[4]
January	Audnaios	Aphuad( )	Dios	Dios
February	Peritios	. . . . . .	Apellaios	Apellaios
March	Dystros	Itoinios	Audnaios	Audnaios
April	Xanthikos	Anthester(ios)	Peritios	Peritios
May	Artemisios	Artemisios	Dystros	Dystros
June	Daisios	Herakles	Xanthikos	Xanthikos
July	Panemos	Nenealios	Artemisios	Artemisios
August	Loos	Hadoni(o)s	Daisios	Daisios
September	Gorpiaios	Apilios	Panemos	Panemos
October	Hyperberetaios	Koroip( )	Loos	Loos
November	Dios	Pantheios	Gorpiaios	Gorpiaios
December	Apellaios	Sandis	Hyperberetaios	Hyperberetaios

In these four calendars the count of days uses numerals, α–λα forward count, and in all but that of Lycia the count precisely parallels the julian count.

Calendars with New Year's Day on September 23, Augustus' Birthday

A. with month lengths equal to Julian months (s. p. 175):

The coordination between the months in the East and the Roman months is directed clearly in the calendar for the Asian cities, set out by Dittenberger, *OGI* 458: the year is to begin on the 9th before the calends of October (September 23), line 51, the months are given the same lengths as appear in the hemerologia,[5] lines 68ff., instructions are given for the changeover[6] and subsequently, all months were to begin on the 9th before the calends of months. The intercalary day of the julian calendar was inserted into Xandikos,[7] which was to have 32 days in an intercalary

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[1] In the Hemerologia, entered as Ἑλλήνων. Cf. Kubitschek, p. 101, for testimonia and discussion. New Year for Antioch – 1 October (1 Hyperberetaios) until change to 1 September (1 Panemos) between 458–483 A.D., cf. E. Honigmann, "The Calendar Change at Antioch and the Earthquake of 458 A.D.," *Byzantion* 17, 1945, pp. 336–338.

[2] Testimonia, Kubitschek, p. 56 and pp. 108–109.

[3] Discussion, W. Kubitschek, "Kalenderstudien," *Jahreshefte des Österreichischen Archäologischen Institutes in Wien* VIII, 1905, pp. 116–118. The numbering of days in 30 day months is α–λα (κη for February, 28 days); in 31 day months, day 1 is Σεβασ(τή) thence α–λ (i.e., day 2 is α etc.) as shown in Hemerologia Leyden, Vatican. Hemerologion Florenz numbers α–λα in 31 day months in some cases, but in March, May, July, α, α–λ confirming the other manuscripts.

[4] Kubitschek, *Öst. Jahreshefte* VIII, p. 118.

[5] With some variation in form of the month names: the inscription differs from the Hemerologia in calling the first month merely Kaisar, in spelling Xandikos, with a *delta*, and in giving an ιων ending to Artemisios.

[6] Lines 72ff.: The current Peritios was to run until the 14th, and then Dystros was to begin on the 9th before the calends of February, which adjustment made, the calendars could progress together thereafter.

[7] The intercalary day was ἰντερκαλαρίων καλανδῶν τοῦ Ξανδικοῦ μηνός, and thus,

	Smyrna[1]	Ephesus Asia-Pamphylia[2]	Bithynia[3]	Paphos[4]	Crete	
23 Sept. = 1	Kaisarion	Kaisarios[5]	Heraios	Aphrodisios	Thesmophorion	31 Days
24 Oct. = 1	Tiberion	Apellaios	Hermaios	Apogonikos	Hermaios	30 Days
23 Nov. = 1	Apaturion	Audnaios	Metroos	Aineios	Eiman[7]	31 Days
24 Dec. = 1	Poseideon	Peritios	Dionysios	Jul(i)os	Metarchios	31 Days
24 Jan. = 1	Lenaion	Dystros	Herakleios	Kaisarios	Aguios	28 Days
21 Feb. = 1	Hierosebaston	Xanthikos	Dios	Sebastos	Dioskouros	31 Days
24 Mar. = 1	Artemision	Artemisios	Bendidaios	Autokratikos	Theodaisios	30 Days
23 Apr. = 1	Euangelion	Daisios	Stratios	Demarchexousios	Pontos[8]	31 Days
24 May = 1	Stratonikon	Panemos	Periepios	Ple(is)thypatos	Hyakinthos[9]	30 Days
23 Jun. = 1	Hekatombaion	Loos	Areios	Archiereus	Hyperberetos	31 Days
24 Jul. = 1	Antiocheon	Gorpiaios	Aphrodisios	Hesti(ai)os	Nekysios	31 Days
23 Aug. = 1	Laodikon	Hyperberetaios	Demetrios	Romaios[6]	Basilios	30 Days

[1] 'Ασιανῶν Hem. Flor., identified as the calendar of Smyrna by L. Robert, "Le Calendrier de Smyrne," *REA* 36, 1938, pp. 23–28. Robert points out that the hemerologion makes the common error of -os endings for all these months, which, as essentially Ionian, ended in -n.

[2] Designated Ephesian (Flor.), Asia-Pamphilian (Vat.), generally known as "Asian" in antiquity. Cf. Kubitschek *Kalenderbücher* pp. 91–97, esp. 92, and *Öst. Jahreshefte* VIII, 1905, pp. 108–110.

[3] Testimonia in Kubitschek, *op.cit.* pp. 97–99.

[4] For fuller discussion of Cypriote calendars, see Cyprus, pp. 182 ff. The names here are as given in the list of K. Scott, "Greek and Roman Honorific Months," *Yale Classical Studies* II, 1931, p. 214.

[5] Appears in the hemerologia as Dios, but elsewhere Kaisarios attested. Cf. Kubitschek, *op.cit.* p. 92.

[6] In the hemerologia, under Cyprus, appears here Loos. Scott (*op.cit.*) agrees with Kubitschek (*Öst. Jahreshefte* 8, 1905, pp. 113–114) that Loos is probably a mistake.

[7] So, fairly consistently in the hemerologia, but interpreted as Himalios by Bischoff, *RE* s.v. Kalender, p. 1596.

[8] Or Gorpiaios, hem. Vat.; cf. Kubitschek, *Kalenderbücher*, p. 105.

[9] Possibly Bakinthios, Rhabinthios. Cf. Kubitschek, *ibid.*

year (lines 71 f.) every fourth year (lines 76 f.). According to the decree, this calendar was to have been valid for all the cities of Asia, and copies of it have been found at a number of sites. Although designated "Ephesian" in the Flor. hemerologion, the month names at Ephesus were not identical with the Asian list, although the structure of the calendar at Ephesus may have been the same.[1]

The count of days in the hemerologia is numerical, and in the cases of Bithynia and Paphos (hem. Cyprus) α–λα. In the instances of Ephesus, Smyrna (hem. Flor. Asia) and Asia Pamphylia (hem. Vat.) the count of the last ten days is backward, ι ἐξ(ιόντος) θκ, ηκ, etc. in hem. Flor. for Ephesus and (Asia) Smyrna, ι, θ, η, etc. in hem. Vat. for Asia-Pamphylia.

B. The calendar of Heliopolis (Baalbek), which is given as beginning the month Ab on September 23, may be a calendar which begins the year on Augustus' birthday, and if so, it does not follow the julian month lengths. See under item Heliopolis, below.

Calendars without a 28 day month and without epagomenal days

Tyre[2]	
1 Dios	–18 Nov. (30 Days)
1 Apellaios	–18 Dec. (30 Days)
1 Audnaios	–17 Jan. (30 Days)
1 Peritios	–16 Feb. (30 Days)
1 Dystros	–18 Mar. (31 Days)
1 Xanthikos	–18 Apr. (31 Days)
1 Artemisios	–19 May (31 Days)
1 Daisios	–19 Jun. (31 Days)
1 Panemos	–20 Jul. (31 Days)
1 Loos	–20 Aug. (30 Days)
1 Gorpiaios	–19 Sep. (30 Days)
1 Hyperberetaios	–19 Okt. (30 Days)

Heliopolis (Baalbek)[3]	
1 Nisan	–24 May (31 Days)
1 Eiar	–24 Jun. (30 Days)
1 Ozir	–24 Jul. (30 Days)
1 Thammuz	–23 Aug. (31 Days, day 1×2)
1 Ab	–23 Sep. (30 Days)
1 Ilul	–23 Oct. (30 Days)
1 Ag	–22 Nov. (31 Days, day 1×2)
1 Thisrin	–23 Dec. (30 Days)
1 Gelon	–22 Jan. (30 Days)
1 Chanun	–21 Feb. (31 Days, day 1×2)
1 Sobath	–24 Mar. (30 Days)
1 Adar	–23 Apr. (31 Days, day 1×2)

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probably coming at the beginning of Xandikos, the extra day would fall just a day or two before the intercalation in the Roman calendar (see pp. 156 f.) so the discrepancy between the calendars in intercalary years as against non-intercalary years would be very brief.

[1] Cf. H. Dessau, "Zum Kalender der Provinz Asien," *Hermes* 35, 1900, pp. 332–338, discussing an Ephesian date Ἀνθεστεριῶνος β′ Σεβαστῇ which was equivalent to πρὸ η′ καλανδῶν Μαρτίων, deducing that the structure was the same as the Asian calendar of *OGI* 458 with Anthesterion = Xandikos, and the β′ Σεβαστῇ following the intercalary day described by the inscription. See above, Ephesos, p. 175.

[2] Testimonia, Kubitschek, *Kalenderbücher* pp. 109–110.

[3] Testimonia, *ibid.*, p. 99–101.

Calendars with 30 day months and 5 epagomenal days

	Alexandria[1]		Gaza	Askalon
29 Aug.	1 Thoth[2]	-Dios[3]	1 Gorpiaios	1 Loos
28 Sep.	1 Phaophi	-Apellaios	1 Hyperberetaios	1 Gorpiaios
28 Okt.	1 Hathyr	-Audnaios	1 Dios[4]	1 Hyperberetaios
27 Nov.	1 Choiach	-Peritios	1 Apellaios	1 Dios
27 Dec.	1 Tybi	-Dystros	1 Audnaios	1 Apellaios
26 Jan.	1 Mecheir	-Xandikos	1 Peritios	1 Audnaios
25 Feb.	1 Phamenoth	-Artemisios	1 Dystros	1 Peritios
27 Mar.	1 Pharmouthi	-Daisios	1 Xanthikos	1 Dystros
26 Apr.	1 Pachon	-Panemos	1 Artemisios	1 Xanthikos
26 May	1 Payni	-Loios	1 Daisios	1 Artemisios
25 Jun.	1 Epeiph	-Gorpiaios	1 Panemos	1 Daisios
25 Jul.	1 Mesore	-Hyperberetaios	1 Loos	1 Panemos
24 Aug.	1 Epagomenal		1 Epagomenal	1 Epagomenal

	Arabia[5]
16 Jan.	1 Peritios
15 Feb.	1 Dystros
17 Mar.	1 Epagomenal
22 Mar.	1 Xandikos
21 Apr.	1 Artemisios
21 May	1 Daisios
20 Jun.	1 Panemos
20 Jul.	1 Loos
19 Aug.	1 Gorpiaios
18 Sep.	1 Hyperberetaios
18 Okt.	1 Dios
17 Nov.	1 Apellaios
17 Dec.	1 Audnaios

	Cappadocia[6]
11 Jan.	1 Artaesti
10 Feb.	1 Araiotata
12 Mar.	1 Teireix
11 Apr.	1 Armotata
11 May	1 Xantheris
10 Jun.	1 Mithri
10 Jul.	1 Apomenama
9 Aug.	1 Arthra
8 Sep.	1 Dathusa
8 Okt.	1 Osmana
7 Nov.	1 Sondara
7 Dec.	1 Epagomenal
12 Dec.	1 Artana

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[1] The Egyptian revolving year was fixed to the julian year in 30 B.C., when Thoth 1 was on August 29. Cf. W.J. Snyder, *Am. Journ. Philol.* 64, 1943, p. 385f., showing that the reform took place when the julian year was actually in that relation to the Egyptian. U. Wilcken, *Grundzüge und Chrestomathie der Papyruskunde* I, 1, p. LVI, listed honorific equivalents for the Egyptian months and K. Scott, "Greek and Roman Honorific Months," *Yale Class. Stud.* II, 1931, pp. 241–263 and 271, examined the evidence in great detail. The results may be summarized as follows.

Thoth	Σεβαστός, Γερμανικός	
Phaophi Hathyr	Δομιτιανός	Σωτήρ Νεὸς Σεβαστός
Choiach	Νερώνειος Σεβαστός, ʽΑδριανός, ʼΙουλιεύς	
Tybi	Σεβαστὸς Εὐσέβειος?	Θεογέναιος
Mecheir		Γαίηος
Phamenoth	Σεβαστὸς Εὐσέβειος?	ʼΑγριππίνειος Νερώνειος
Pharmouthi		
Pachon	Γερμανίκειος	
Payni	Σωτήριος, Δρουσίλληος	
Epeiph	Σεβαστὸς Εὐσέβειος? Δρουσιεύς	
Mesore	Καισάρειος	

[2] New Year, as it had long stood in the Egyptian Calendar.

[3] This was the relationship established between the Macedonian and Egyptian calendars during the second century B.C. See p. 150.

[4] New Year. Brief discussion by Kubitschek, *Kalenderbücher*, p. 99.

[5] Cf. Kubitschek, *ibid.*, p. 91.

[6] The month names are given variously in

The count of days for all these calendars is given numerically in the hemerologia, α–λ, and this is confirmed at least for the Alexandrian by the multitude of uses attested by the papyri and the inscriptions, using this numerical system.

For these calendars, as well as for the foregoing, where attestation exists, either in epigraphical or in literary sources, the hemerologia are confirmed even for the earliest (i.e. first century) period of Roman domination in the East. This fact would suggest that the hemerologia are indeed based on parapegmata or tables which have their origin in the first centuries of our era.

2. *Eastern Calendars not Reported by the Hemerologia*

The hemerologia by no means account for all the local calendars in use in the Roman East. There was a great variety of systems, both in lists of month names, some based on the Seleuko-Macedonian lists, others on old Semitic names, and still others on local names, and also in systems of regulations of the year. Some of these calendars are attested only fragmentarily, for others we can determine the names of all the months, while for a few we list all the months and make some attempt to understand the regulation of the calendar itself.

The Macedonian Calendar at Palmyra

As elsewhere in Syria, the Macedonian months are found at Palmyra equated precisely to the local months. Unfortunately, the flowering of the city, the biblical Tadmor, came late, so that the evidence shows the calendar only in the period of Roman domination. The Palmyrenes used the Seleucid Era (q.v.) and the earliest inscription,[1] Sel. 304, month of Kanun, belongs to 9 B.C. The abundance of bilingual inscriptions, Greek and Palmyrene, makes it possible to see the relationships between the Macedonian and Palmyrene months.[2] The calendar begins with Hyperberetaios = Tishri[3] and the Macedonian months proceed in correlations with the Palmyrene,

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the hemerologia and in the other sources, (cf. Kubitschek, *op.cit.* pp. 101–104), obviously in an attempt to render the unfamiliar Cappadocian names in Greek or Latin. The names given here accord most closely with the hemerologia names but take other evidence into account. The phonology is at best an approximation of the true Cappadocian. Cf. K. Hanell, "Das Menologium des Liber glossarum," *Kung. Human. Vetenskapssamfundet i Lund, Årsberättelse* 1932, pp. 27–32.

[1] *Inv. Inscr. Pal.* IV, 28.

[2] J. Chabot, *Choix d'Inscriptions de Palmyre*, Paris, 1922, p. 13, has set forth the correspondences.

[3] The clearest indication that Hyperberetaios began the year comes from a sundial published by H. Ingholt, *Berytus* III, 1936, pp. 112–114. Only the left half of the block is preserved, but on it appear in a column ’Απελλαῖ(ος) Δεῖος ‘Υπερβερε(ταῖος) [Γ]ορπιαῖος Λώος [Π]άνημος, with a line drawn between Hyperberetaios and Gorpiaios. The line must indicate a beginning of the year at

most of which in turn are derived from the Babylonian month-names. In the list below, only one reference is given for each attestation of correlation.

Hyperberetaios	= Tishri	*Inv. Inscr. Pal.* IX 27, 127 A.D.
Dios	= Kanun	*Inv. Inscr. Pal.* IV 22, 171 or 181 A.D.
Apellaios	= Kislul	*Inv. Inscr. Pal.* III 10, 262 A.D.
Audnaios	= Tebet	
Peritios	= Shebat	*Syria* 17, 1936, p. 346, No. 21, 115 A.D.
Dystros	= Adar	*Syria* 19, 1938, p. 76, 84 A.D.
Xandikos	= Nisan	*Inv. Inscr. Pal.* IV 3, 83 A.D.
Artemisios	= Iyar	*Syria* 19, 1938, p. 74, 159 A.D.
Daisios	= Siwan	
Panemos	= Quenian	
Loos	= Ab	*Inv. Inscr. Pal.* IX 26, 193 A.D.
Gorpiaios	= Elul	*Inv. Inscr. Pal.* IX 6b, 17 A.D.

This correlation between the two calendars, Macedonian and Palmyrene, follows the pattern of the later correlation in the Seleucid calendar (q.v., p. 143), a correlation which was shifted not before 15/16 A.D. and not after 46/47 A.D. If the Palmyrene pattern may be taken as evidence for the Seleucid, the correlation Gorpiaios = Elul of 17 A.D. would narrow to one or two years the assignment of the date of the change of correlation. In any case, we have no evidence for the earlier arrangement at Palmyra, and we can be confident of this assimilation between the month names from 17 A.D. on.

The nature of the calendar has been much discussed, with argument proposing that the Palmyrene calendar was solar with the Palmyrene-Macedonian months equated directly to the julian months,[1] while other scholars urge that the year was organized around strictly lunar months.[2] The evidence on which to build either case is extremely scanty.

We should expect the Palmyrene calendar to have been luni-solar, at least in the first two centuries A.D. The Seleucid (Neo-Babylonian) 19 year cycle remained in civil use at Dura at least until 176 A.D.[3] Langdon[4] has described the Aramaic calendar of Palmyra as "borrowed directly from the Babylonian and post exilic system with the exception of Arahsamna," and such a borrowing might well carry the presumption of the retention of the 19 year luni-solar cycle. In Babylonia the 19 year cycle

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that point, and this reasoning would appear to be confirmed by Cumont, *Fouilles de Doura-Europos*, Paris, 1926, p. 349, citing a Palmyrene inscription at Dura which says expressly that one of the exedras of the tomb of Malkou was constructed in the month of Elul which ended the year 497. The inscription is published by Ingholt in *Berytus* II, 1935, pp. 93–95.

[1] Ginzel III, p. 35; Clermont-Ganneau thought the calendar was solar but not julian, *Etudes d'archeologie orientale* II, pp. 62–76; Johnson, *Dura Studies*, p. 10, thought the evidence from Palmyra, with no intercalary months found among a large number of dated texts, might indicate that the Palmyrenes took over the Latin months.

[2] Cumont, *Fouilles de Doura-Europos*, p. 349, suggested that the graffiti with Dystros embolimos in the temple of the Palmyrene gods at Dura might suggest that the Palmyrenes had continued to use the luni-solar year, and in *Les Religions orientales dans le paganisme romaine*, 4th ed., 1929, p. 262, n. 75, Cumont held to his earlier view that the Palmyrene calendar was luni-solar.

[3] See above, 142.

[4] S. Langdon, *Babylonian Menologies and the Semitic Calendars*, London, 1935, p. 64.

persisted at least until 75 A.D.[1] The absence of intercalary months at Palmyra is disturbing, but that absence is not so compelling as to require the assumption of a calendar equation to the julian months; many of the months are very poorly represented among the inscriptions, and intercalary months might have existed. Buttrey has suggested[2] that the Elul attested in *Berytus* II, 1935, p. 95, might have been intercalary. On the other hand, cities further west, like Gerasa and Baalbek for example, do seem to have had calendars equated to the julian. For Palmyra, the question must remain open.

Very few of the Palmyrene inscriptions are dated by day of the month. Enough do give dates, however, to show that the use of Greek numerals was the same as in the Seleucid and Macedonian-Egyptian calendars (q.v.), both by occasional numeration of days[3] and consistent use of numerals to designate the year of the Seleucid era. There are occasional numerations of days in Palmyrene script,[4] as well as numbers for Seleucid years given in the Palmyrene also.

The Macedonian Calendar at Gerasa

Although Gerasa, Antiochia on the Chrysorhoas, was a Hellenistic foundation, epigraphical evidence in Greek does not begin until the first century and is not plentiful before the second. The earliest date is of A.D. 22. The evidence for the calendar all comes from the period of Roman control, and the major question open with regard to the Gerasene calendar is that of the extent of the effect of Roman practice on that of Gerasa.

The month names are all Macedonian and as attested by two mosaics[5] they follow the Macedonian sequence. Both mosaics seem to begin the year with Audnaios, for the year thus made up: Audnaios, Peritios, Dystros, Xandikos, Artemisios, Daisios, Panemos, Loios, Gorpiaios, Hyperberetaios, Dios, Apellaios. Although the texts are extensively restored, there seems little doubt that this is the intended list and order of the months. However, although we have this list, we are not able to know with what month the year began or find any certain equivalences to julian months. A certain number of inscriptions dated by Macedonian or julian months along with the number of the indiction and the year in the Gerasene Era (beginning in 63 B.C.) provide some delimitation. The most useful is *Inscr. Gerasa* 335, dated 673 (Gerasene Era), indiction 15, September. Now year 673 began in 610 A.D., and indiction 15 on September 1, 611; in order for year 673 to overlap indiction 15, it must have ended after September 1, and thus the year must have begun after September 1. This would establish the period 1 September – 31 December as the period in which the Gerasene year must have begun. McCown, who has made the fullest study of the Gerasa material,[1] has accepted the evidence of this text, as has Welles[2] in accepting an autumn beginning for the year. Beyond the conclusion that the Macedonian months were used in the regular order, and that the year began in the fall, the evidence provides no certain guide, although tempting and plausible conclusions may be offered.[3]

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[1] Cf. R.A. Parker, W.H. Dubberstein, *Babylonian Chronology*, Providence 1956, p. 3.

[2] *Berytus* XIV, 1963, p. 128.

[3] E.g., ς, *Inv. Inscr. Pal.* VI 13; ζ, *Syria* 17, 1936, p. 346, no. 21; η, *Inv. Inscr. Pal.* IX 20; ςι, Syria 18, 1937, p. 372; ϰ, *Annales Archéologique de Syrie* 7, 1957, p. 102; ϰε, *Syria* 13, 1932, p. 279.

[4] 20, *Rev. Assyr.* 1930, p. 44, no. 28; 25, *Inv. Inscr. Pal.* VIII 140; 30, *Inv. Inscr. Pal.* IV 270.

[5] *Gerasa, City of The Decapolis*, The Inscriptions, New Haven, Connecticut, American Schools of Oriental Research, 1938, (hereafter referred to as *Inscr. Gerasa*), Inscriptions 295 and 307.

The count of days was usually of the numerical sort, A–I, IA–K, KA–Λ; occasionally these numerals are written out, as e.g., *Inscr. Gerasa* 26, Δύστρου δευτέρᾳ καὶ εἰκάδι.

The Calendar of The Province of Asia

On a number of occasions completely new calenders were introduced, either at official behest or on local initiative, sometimes for the purpose of rationalizing time reckoning, sometimes for honorific purposes, sometimes as a combination of both motives. By new calendar I do not mean the reorganization of an existing calendar, wherein the old list was maintained both in names and sequence of months but was adjusted to run consistently with the julian year, a reform like that which Augustus imposed on the Egyptian calender in 30 B.C. (See above, p. 177 note 1). Rather, I mean an introduction of a new or radically changed list of months which was imposed in entirety and was structured to fit julian calendaric theory.

The most famous of these calenders is the "Calendar of Asia," *Inschr. Priene* 105, = *OGI* 458 etc.[4] This calendar, introduced in 9 B.C.[5] and adopted according to the inscription by "the Greeks in Asia," and set up by proconsular decree,[6] was a complete calendar with month lengths set forth against the control of the julian calendar, and with the beginning of the year and the intercalation of the leap-year day established in terms of the julian year: οἱ μῆνες κατὰ τάδε· Καῖσαρ ἡμερῶν $\overline{\alpha\lambda}$, Ἀπελλαῖος ἡμερῶν $\overline{\lambda}$, Αὐδναῖος ἡμερῶν $\overline{\lambda\alpha}$, Περίτιος ἡμερῶν $\overline{\lambda\alpha}$, Δύστρος $\overline{\kappa\eta}$, Ξανδικός $\overline{\lambda\alpha}$, Ἀρτεμισιὼν ἡμερῶν $\overline{\lambda}$, Δαίσιος $\overline{\lambda\alpha}$, Πάνημος $\overline{\lambda}$, Λῶος $\overline{\lambda\alpha}$, Γορπιαῖος $\overline{\lambda\alpha}$, Ὑπερβερεταῖος $\overline{\lambda}$. These months are, of course, the Macedonian months in broad use all over the East, and in their proper order, but the effect of the new calendar was to give them established lengths. Prior to the introduction of the new calendar, the Macedonian luni-solar calendar probably was in general use in Asia.[1] The text further states that the year was to begin on the 9th before the calends of October, Augustus' birthday, i.e., September 23, (line 51), and the procedure for intercalation is set out to ensure compatibility with the julian calendar: in years with intercalation Xandikos was to have 32 days (line 71) and the intercalary day was to be ἰντερκαλαρίων καλανδῶν τοῦ Ξανδικοῦ μηνός, (line 76). This means, presumably, that the first day of Xandikos was to be doubled in such circumstances, and in the adaptation of this Asian calendar to the julian, Xandikos would normally begin around February 23 so that the doubling of the first day of that month would bring intercalation in the Asian calendar very close to the time of intercalation of the julian.[2] Lines 72ff. give detailed instructions for the changeover, in order to make the adjustment to bring Kaisar 1 to September 23: the then running Peritios was to continue to the 14th, but on the 9th before the calends of February Dystros was to begin; the effect would bring about the stated objective that subsequent months would then begin on the 9th before the calends of each (Roman) month.[3]

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[1] C.C. McCown, "The Calendar and Era of Gerasa," *TAPA* 44, 1933, pp. 81–88, examined, *inter alia*, the text later published as *Inscr. Gerasa* 274, dated year 504, Gorpiaios, indiction 10; year 504 falls in 441/2 A.D., and indiction 10 begins on 1 September 441, so that the text cannot tell us much about the organization of the year. This text had previously been read as indiction 11 and had been used as the basis for arguing the date of the beginning of the year.

[2] *Inscr. Gerasa*, pp. 358, and 468–9, commenting on *Inscr. Gerasa* 274.

[3] McCown, *op.cit.* p. 86, suggesting a number of possibilities for New Year's day, as September 23, Augustus' birthday, prefers the possibility, thinking it a probability, that the year began on or near 1 October with Dios 1, with only the reservation that the mosaics suggest that the year began with Audnaios. The mosaic evidence can perhaps be avoided with some safety, accepting either McCown's suggestion that the mosaics were dealing with seasons, or perhaps more likely, that they were merely giving Macedonian month equivalents for the Roman months, as the hemerologia (q.v.) did, starting the list with equivalences for January regardless of the beginning date in the local calendar. Withal, Welles is probably right in saying (*Inscr. Gerasa*, p. 469) that "There seems no possibility at present of certainly resolving Gerasene month dates into Julian equivalents."

[4] Now restudied, with many of the fragments republished, by V. Laffi, "Le iscrizioni relative all' introduzione nel 9 a.c. del nuovo calendario della provincia d'Asia," *Studi Classici e Orientali* 16, 1967, pp. 5–98.

[5] The date, seen as doubtful by R.K. Sherk, *Documents from the Greek East*, 1969, is accepted by Laffi, *op. cit.*, pp. 27–32.

[6] The proconsular decree is specially treated by Laffi, *op. cit.*, pp. 34ff.

This calendar was in extensive use in Asia Minor[4] and is reported by the hemerologia as the calendar of Ephesus and Asia-Pamphilia (above, p. 175 and note 2). The calendar theory of this calendar may well have been extended to other calendars of 365¼ days which began on Augustus' birthday (see hemerologia p. 174) but which used different month names. There is no doubt that the calendar was not used universally in the province of Asia. Cities like Miletus, Ephesus, Pergamum, Smyrna, and Magnesia (q.v.) all preserved their former months, and there is no evidence beyond numeral count that any of these calendars but that of Smyrna were adapted to the julian calendar.[5]

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[1] Such is the conclusion of Laffi, *op. cit.*, pp. 39–41. This is what one would expect, although I do not think that Laffi has actually demonstrated this; with the relatively scarce evidence available, it may not be demonstrable.

[2] I.e., towards the end of February, *a.d. VI Kal. Mart.* See above, p. 156, note 1.

[3] It is interesting to note that the interval between intercalation is stated as δύο ἐτῶν μέσων, repeating the pontifical misunderstanding of Caesar's reform, so that a day was intercalated every three years instead of every four (see above, p. 156). Cf. Laffi, *op.cit.*, pp. 28ff.

[4] Laffi, *op.cit.*, pp. 71–81, citing both the hemerologia and double dates in inscriptions, concluded that the calendar was in general use in Asia Minor.

[5] Although the new calendar was a scheme for honoring Augustus and was introduced with elaborate flattery, there was enough deviation to suggest a good deal of doubt about its real universality, at least in the major centers of the province. Cf. the comments of D. Magie, *Roman Rule in Asia Minor*, Princeton, 1950, pp. 480 and 1343, note 40. Laffi too, *op.cit.*, pp. 80–81, acknowledges the existence of deviation.

Cyprus

New calendars were introduced to Cyprus on two separate occasions. The first of these, which appears in a dodeceteris in Codex Parisinus 2420, was composed of a list of months named in honor of Augustus' family and was introduced in or about 15 B.C.[1] The calendar was tied to the julian:[2]

Month	Beginning	Days
Σεβαστός	2 October	31
Ἀγρίππαιος	2 November	30
Λίβαιος	2 December	31
Ὀκτάβαιος	2 January	31
[Ἰούλαιος]	2 February	28
Νερώναιος	2 March	31
Δρούσαιος	2 April	30
Ἀφροδίσιος	2 May	31
Ἀγκίσαιος	2 June	30
Ῥωμαῖος	2 July	31
Αἰνεάδαιος	2 August	31
Καπετώλιος	2 September	30

The months run almost concurrently with the julian months as virtual equivalents and they have the same lengths as their julian counterparts.

Probably because of the deaths of those honored by a number of months in this calendar it was soon replaced by another. The menologion of Madrid Codex Gr.

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[1] This first calendar is recorded by Papias, quoted by L. Bröcker, *Philologus* 2, 1847, p. 248, credited to the *hellinum* or *hellenorum*. Papias has some of the names imperfectly, and the wrong equations: *Agripeos hellinum lingua februarius mensis. Libenos hellenorum lingua martius mensis. Oetias aprilis helinum lingua. Druseo hellenum lingua mensis iulius. Afrodisius helinum lingua augustus mensis dicitur. Anchyseos hellenorum lingua september mensis. Pomos hellenum lingua october mensis. Eneados hellinum lingua novembris mensis.* Although the forms of some of the names are imperfect, there is only one, Oetias (= Oktabaios) which is not readily understandable in terms of the Cypriote list. Bröcker, p. 257, suggested that Octeas was "vielleicht verschrieben," and the suggestion was approved by Hermann, "Bemerkungen zu den menologischen Glossen des Papias," *Philologus* 2, 1847, pp. 262–272. Furthermore, although Papias has misunderstood the relationship between the Cypriote list and the julian calendar, taking the first Cypriote month to be equivalent to the first month of the julian calendar (i.e. the second Cypriote month, *Agripeos* = February), he preserves the proper order and even the spacing between the months in his incomplete list: e.g., he skipped two julian months between *Oetias* and *Druseo*, and two months intervene between Oktabaios and Drousaios in the Cypriote list.

For full discussion of this and the subsequent Cyprian calendar, see K. Scott, "Greek and Roman Honorific Months," *Yale Class. Stud.* II, 1931, pp. 207–219.

[2] The peculiar correlation of this Cypriote calendar with a julian year beginning on October 2 is not explained, and one would expect correlations with the first of the month, or with an anniversary date like September 23. The reason may be a different time of beginning of the day. That is, if the Cypriote day began in the evening, while the Roman day began at midnight, with the Cyprian calendar month beginning on the evening of the first of the Roman month, the daylight hours of 1 Sebastos, for example, would come during 2 October. This may be the situation reflected by the correlation as presented, and although it is entirely hypothetical, it is a circumstance attested in other places; for Laffi's suggestion that the months actually began on the first day each Roman month, cf. *op.cit.*, p. 44, and note 57.

XCV gives a list of months, one of which, Archiereus, indicates that the calendar post-dates 12 B.C., when Augustus became pontifex maximus. As there is no allusion to the title *pater patriae*, one may guess that the calendar was introduced before 2 B.C., when Augustus took that title. The menologium gives the list for Paphos, and the calendar is more or less confirmed by the Leiden and Florence hemerologia (see above, p. 175), which give the julian equivalents and lengths of the months as well.[1] In the list below, I prefix the resolutions of contradictions as argued by Scott:[2]

Scott	Madrid MS	Hemerologia	Beginning	Days
Aphrodisios	Ἀφροδίσιος	Ἀφροδίσιος	23 September	31
Apogonikos	Ἀπογονικός	Ἀπόλλω	24 October	30
Aineios	Αἰνικός	Ἄνιος	23 November	31
Iulos or Iulios	Ἰούνιος	Ἰούνιος	24 December	31
Kaisarios	Καισάριος	Καισάριος	24 January	28
Sebastos	Σεβαστός	Σεβαστός	21 February	30
Autokratorikos	Αὐτοκρατορικός	Αὐτοκράτωρ	23 March	31
Demarchexousios	Δημαρχεξάσιος	Δήμαρχος	23 April	31
Plethypatos or Pleisthypatos	Πληθύπατος	Πλησθύκατος	24 May	30
Archiereus	Ἀρχιερεύς	Ἀρχιέριος	23 June	30
Hestios or Hestiaios	Ἔσθιος	Ἑστιέος	24 July	30
Romaios	Ῥωμαῖος	Λῶος	23 August	31

As Scott has pointed out,[3] this calendar is attested in inscriptions of the Christian period. It is also mentioned by the church fathers in references to the baptism and birth of Christ, references which introduce us also to another calendar of Cyprus. Epiphanius, bishop of Salamis, writing in the fourth century,[4] tells us that the day of Christ's birth, 6 January, was 14 Iulos in the Paphian calendar, and in the calendar of Salamis was the 5th day of the 5th month; the baptism was 8 November; in the Paphian calendar 16 Apogonikos, at Salamis the 6th day of the third month, Choiach. The monk Alexander of Cyprus mentions the month Plethypatos in his Encomium of St. Barnabas, and also gives an equation for Salamis, 11 June = Mesore 11, Mesore being the tenth month.

This is more than adequate testimony to continued awareness of the Paphian calendar, an awareness which was perhaps more general than the hemerologia alone would attest. But these texts also introduce us to the calendar of Salamis, a calendar which from the names of the months goes back to an Egyptian source, probably first introduced to Cyprus during the period of Ptolemaic control. While the problem of the structure of this calendar has been well studied by Jerphanion,[5] I do not think that it is possible to reconstruct the full list of months. Choiach is called the third month at Salamis while it is the fourth in the Egyptian calendar; Mesore is the tenth month at Salamis; in the Egyptian calendar it is the twelfth month; between third and tenth month (the Salamis system) come six months, while in the Egyptian calendar there are seven months between Choiach and Mesore. It is clear that we do not have here a calendar identical to the Egyptian list, and I think that it is impossible to determine whether we have to deal with a calendar which merely rearranges the Egyptian months as Jerphanion suggests,[1] or whether the Salamis calendar contains Egyptian months and other months as well with the Egyptian months in new positions, a kind of pattern familiar from calendars which use some but not all Macedonian months.

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[1] It is worth noting that this is one of the calendars which begins the year on Augustus' birthday.

[2] *Op.cit.*, p. 214.

[3] *Op.cit.*, p. 213.

[4] *Adv. Haer.* LI, 24.

[5] G. de Jerphanion, "Observations sur le calendrier de Salamine de Chypre a l'époque chretienne," *Antiquité Classique* 1, 1932, pp. 9–24.

One thing is clear from the information we do have however, and that is that with the third month, day 6 = 8 November, and with Mesore 11 = 11 June, we are dealing with a calendar the first month of which started in September. Indeed, the relationship between the two equations strongly argues that the calendar structure as a whole was of Egyptian type, i.e., 12 months of 30 days each plus 5 epagomenal days, probably, since it is attested late, with the provision for quadrennial intercalation like the Alexandrian calendar introduced by Augustus. 6 Choiach = 8 November fits perfectly into a structure with 11 Mesore = 11 June if each month were 30 days, so that 1 Choiach = 3 November and 1 Mesore = 1 June; furthermore the two will fit working from Mesore to Choiach if the 5 epagomenal days are posited. On this reasoning, the first day of the year was 4 September. This was Jerphanion's conclusion, and pointing to the fact that in 46 B.C. 1 Thoth, the beginning of the Egyptian vague year, would have fallen on 4 September, Jerphanion suggested that the fixing of the Cyprian calendar with new year on 4 September occured in that year on the occasion of the introduction of the julian reform at Rome.[2] This is a seductive proposition and it may well be correct, but it is well to note some difficulties. The suggestion implies that the Egyptian year with Thoth as month one was in force at Salamis so that the fixing could take effect, and that whatever changes there were, they took place subsequently and they were made while preserving the beginning of the year on 4 September. Or alternatively, that the Cyprian calendar, whatever it was, ran precisely currently with the Egyptian year with month one coming at the same time as 1 Thoth, so that the relationship between the beginnings

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[1] *Op.cit.* p. 14f. The table on p. 15 offers the following equations:

I	(Phaophi?	Hathyr?)	30 days, beginning	4 September
II	(Hathyr?	Tybi?)	30	4 October
III	CHOIACH		30	3 November
IV	(Tybi?	Mecheir?)	30	3 December
V	(Mecheir?	Phamenoth?)	30	2 January
VI	(Phamenoth?	Pharmouthi?)	30	1 February
VII	(Pharmouthi?	Pachon?)	30	3 March
VIII	(Pachon?	Payni?)	30	2 April
IX	(Payni?	Epiph?)	30	2 May
X	MESORE		30	1 June
XI	(Epiph?	Thoth?)	30	1 July
XII	(Thoth?	Phaophi?)	30	31 July
	EPAGOMENAL		5	30 August

[2] *Op.cit.*, pp. 17–24.

of the two calendars and the julian reform was the same. Finally, the conjunction 1 Thoth = 4 September occurred in four years, 49–46 B.C., but the theory allows the selection of only one of the possible years as the year of the inauguration of the new calendar. Despite these reservations, the hypothesis is certainly possible, and Bickerman thought it was "probably" right.[1] If it is correct, the reform of that calendar would be the first example of the spread of the julian year to the East.

The Julian Calendar in The East

As the hemerologia demonstrate, the julian reform had a significant impact on the calendars of the Eastern cities, but the effect differed from place to place. Some cities, like Antioch and Sidon, seem to have adopted the julian system in toto, preserving only the local month names in place of the Roman names. Others had months equal in length to the julian months but not co-terminous with them. Some began the year with Augustus' birthday, while others had different new year's days. Some calendars had 30 day months plus epagomenal days to bring the compatibility with the julian year, while others had more complex methods of adjustment.

The adoption of the julian system in the East may have begun with its introduction in the West, if Jerphanion's hypothesis about the Salamis calender is correct. By 30 B.C. the julian year reached Egypt, as it was in that year that Augustus tied the Egyptian vague year to the julian (see above, p. 177). The julian Asian calendar was introduced in 9 B.C. It is probable that the adaptations to the julian system attested by the hemerologia were introduced in the same period, or at least during the reign of Augustus. However, as Bickerman has pointed out,[2] the julian year did not completely displace the pre-existing lunar calendars. Even in Egypt, where calendar adjustment to the julian system was consistently followed in all official activity, the old variable year persisted in the first centuries of our era, usually designated by the term κατ' ἀρχαίους.[3] In addition, the Egyptian lunar year also persisted not only in Egyptian temple use,[4] but also in Greek documents, where days according to the lunar calendar were designated by the term Σελήνη xx usually noted along with the date in the civil calendar.[5] In Asia Minor, the month names in the julian Asian Calendar of 9 B.C. were not universally adopted, but the local calendars themselves may have been converted to the julian system (see above, pp. 171 ff.). It may be that the growth of use of numeral count of days in some of the cities, like Pergamum and

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[1] *Chronology* 1968, p. 48.

[2] *Chronology* 1968, pp. 48 f.

[3] Cf. U. Wilcken, *Griechische Ostraka* I, pp. 791 ff., for a summary of the evidence, and note the remark of Censorinus (*De die nat.* 18) that the Egyptian year was 365 days without intercalation, suggesting the persistence of the old year at least to the third century.

[4] For examples of Egyptian use, cf. R.A. Parker, *The Calendars of Ancient Egypt*, Oriental Institute of the University of Chicago, Studies in Ancient Oriental Civilization, No. 26, Chicago, 1950.

[5] Cf. V. Grumel, "Notations chronologiques de plusieurs inscriptions chretiennes d'Egypte et de Nubie," *Byzantion* 35, 1965, pp. 83–88.

Smyrna (q.v.) or Aphrodisias[1] indicate the abandonment of decadal count and the acceptance and adaption of the julian calendar to the local calendars. However, there is not enough evidence about the internal workings of these calendars to confirm or deny such a suggestion. At Sardis the month names had been Macedonian before the Roman conquest, and these persisted. There is no firm indication whether and when the Asian Calendar or the julian reform was accepted at Sardis, but there is evidence that lunar dates were still in use as late as 459 A.D. from an equation between a julian and a Macedonian month, a.d. V Kal. Mai. = Daisios 4, in *Inscr. Sardis* 18.

The old Seleucid 19 year cycle, or lunar calendars in general, seem to have survived in the Levant, Syria, and Babylonia. The 19 year Seleucid cycle was in use at Babylon until at least 75 A.D.,[2] and coins from Seleucia on the Tigris suggest its survival there until at least 46/47 A.D.[3] At Dura the calendar operated on the 19 year cycle as late as 176 A.D.[4] At Palmyra the calendar probably was not julian in nature,[5] although certainty has not yet been achieved, and at Gerasa the situation is even more doubtful.[6]

Eventually of course, the julian system prevailed, and even the Roman month names finally were adopted.[7] As time went on, Roman month names appear in the East not only in documents of Roman origin (e.g. *a.d. V Id. Febr.*, dating a decree of the senate, *Inschr. Priene* 41), but also dating local documents. The actual use of Roman month names is a late phenomenon, characteristic of the Byzantine periods and is found in the Greek homeland as well as in the Eastern provinces.[1] The success of the julian system destroyed all the ancient calendars in Greece, and all but the Hebrew calendar in the Eastern provinces. It would take the Moslem success to bring back lunar reckoning to a position of importance in the Mediterranean.

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[1] The situation at Aphrodisias in Caria is interesting, and it is a pity that the recent editors of Aphrodisias inscriptions did not present the texts in a more manageable form. That numeral notation was used is clear: η', *MAMA* VIII 550; πέμπτος, 553; θ', 571; ι', 568; δωδέκατος, 577. There are also honorific months, six attested, according to Scott, "Honorific Months," *Yale Class. Stud.* II, 1931, p. 265: Kaisar (cf. *MAMA* VIII 555), Tiberios, Ioulieos (cf. *MAMA* VIII 541), Klaudieos (cf. *MAMA* VIII 556a) and Traianos Sebastos (cf. *MAMA* VIII 559). Besides all this, Macedonian months are attested, as Bischoff noted (*RE* s.v. Kalender, p. 1586), e.g., Loos, *MAMA* VII 566; Gorpiaios, 537; Apellaios, Deios, Xandikos, 413; this suggestets that the city used Macedonian months in Hellenistic times, and that these were replaced, either one by one or by a totally new calendar, in Roman times.

[2] See p. 180; for complete discussion of the Seleucid calendar, pp. 139–145.

[3] The coins indicate a change in the first month of the calendar, but the Seleucid system seems to have continued; see p. 143.

[4] The Dura evidence was the first to suggest the shift in the first month; the evidence for the persistence of the 19 year cycle, coming as it does from a horoscope, is quite convincing. See p. 142.

[5] There is a Dystros embolimos in the temple of the Palmyrene gods at Dura, suggesting retention of a lunar system; see p. 179.

[6] Welles has abandoned any attempt to equate dates in the Gerasa calendar to julian dates; see p. 180.

[7] Before there was a tendency to adopt the month names of the original Roman type, there was a general acceptance of honorific months. As Scott has shown, *Yale Class. Stud.* II, 1931, pp. 201–278, the phenomenon was very widespread. Honorific month are attested as making up whole calendars, e.g., Cyprus, above, pp. 183 f., or heavily infiltrating existing calendars, as in Egypt, above, p. 177. The spread of the practice may be illustrated by the chance occurances of months: Kaisar: at Lagina in Caria (*BCH* 11, 1887, p. 29, No. 42); at Gordos in Lydia (Le Bas-Wadd. III 1535); at Panamara (*BCH* 51, 1927, p. 94, No. 61, corr. p. 344); at Pergamum (above, p. 125); with Tiberios, at Cos (above, p. 112); Neokaisareon, at Thira in Lydia (*Ath. Mitt.* 3, 1878, p. 56, No. 1); Sebastos at Smyrna (*CIG* 3203) and Maimule in Phrygia (*Ath. Mitt.* 25, 1900, p. 408, No. 16).

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[1] E.g., *Inscr. Corinth* 530, and many similar epitaphs in Corinth, Vol. VIII, part. 3, 1966; at Miletus, a date of October, *Istanbuler Mitt.* 15, 1965; p. 133; at Sardis, a very late Μαρτίω ιε′, *Inscr. Sardis* 176.

CHAPTER VII

GREEK CHRONOGRAPHY

1. Olympiad Reckoning

According to late Greek sources records were kept at Olympia of victors in the quadrennial games,[1] and the records were certainly open and available in late Hellenistic and Roman times.[2] The games themselves were held at four year intervals and were called in Greek ὀλυμπιάς, a term which came to be applied as well to the four year period made up of the year in which the games were held plus the three following years. Thus the term ὀλυμπιὰς ἑκατοστή by itself can mean either the one hundredth set of games or can indicate the four year period associated with the 100th celebration of the games.

The Olympic Victor List

The list of victors, first drawn up by Hippias at the end of the fifth century B.C., provided the means of using the periodic Olympiads of four years as the elements of a chronographic framework, in which the number of the Olympiad was given, sometimes along with the number of the year in the four-year cycle.[3] The Olympiad reckoning system, originated by Philistus, was subsequently used in an historical context by Timaeus,[4] and from then on we find historical chronologies based on Olympiads.[5]

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[1] Cf. Paus. III, 21, 1; VI, 22, 3. For the list as known today, cf. L. Moretti, "Olympionikai, i vincitori negli antichi agoni olimpici," *Atti della Accademia Nazionale dei Lincei*, Ser. 8, vol. 8, 1959, *Memorie*, pp. 59–198.

[2] The diversity of sources for the list of Moretti, *supra*, including papyrus texts, attest the extensiveness of the knowledge of the list of Olympic victors.

[3] Cf. *P. Oxy.* 12 (*F. Gr. Hist.* 255) numbering the years of each Olympiad, and listing the events of each of these years.

[4] Diodorus, V, 1, comments on Timaeus' μεγίστην πρόνοιαν τῆς τῶν χρόνων ἀκριβείας which was a model for his successors; Polybius, XII, 11, 1, alludes to Timaeus' comparison of Spartan ephors and kings, Athenian archons, and Olympic victors, for chronological purposes.

[5] E.g., by Aristotle (Diog. Laert. V, 26); Eratosthenes (*F. Gr. Hist.* 241); Phlegon of Tralles (*F. Gr. Hist.* 257); cf. also the Oxyrhynchus Chronicle, *P. Oxy.* 12 (*F. Gr. Hist.* 255) for an example of connected text of such historical chronologies.

The assignment of datable events to Olympiads years by later authors makes it possible to reckon backwards to establish the epoch 776 B.C. = Ol.1, 1. For example, Diodorus, (XX, 5, 5) reports a solar eclipse for Ol.117, 3,[1] and that must be the eclipse of 15 August 310 B.C.[2] Reckoning back from that date, Ol.1, 1 = 776 B.C. This epoch is confirmed for the Roman period, by, *inter alia*, Eusebius, *Praep. Evang.* 10, 9, placing the 15th year of Tiberius in Ol.201, 4. Tiberius' 15th year is 28 A.D.,[3] and Ol.201, 4, working back from 28 A.D., yields 776 B.C. for Ol.1, 1. Abundant evidence exists to show that the lists and chronologies available from Hellenistic times on operate to yield 776 B.C. for the epoch.[4]

By Hellenistic times the list of victors was complete and reasonably consistent[5] and the framework for chronology was established and accepted. Whether all this was right, or whether events were assigned to years correctly, is another matter. The shrewd Plutarch had his doubts (*Numa*, 1, 4): τοὺς μὲν οὖν χρόνους ἐξακριβῶσαι χαλεπόν ἐστι, καὶ μάλιστα τοὺς ἐκ τῶν 'Ολυμπιονικῶν ἀναγομένους, ὧν τὴν ἀναγραφὴν ὀψέ φασιν 'Ιππίαν ἐκδοῦναι τὸν 'Ηλεῖον, ἀπ' οὐδενὸς ὁρμώμενον ἀναγκαίου πρὸς πίστιν. Although there is ample testimony to the name of the victor in 776, Koroibos,[6] the games of that year may in fact not have been the first celebration. Pausanias, V, 4, 5 and V, 8, 5, speaks of the renewing of the games by Iphytos, and V, 7, 6 – V, 8, 4 recounts victories from earliest times.[7] The victory of Koroibos (Ol.1, 1) began the continuous tradition of games (Paus. V, 8, 6), but Plutarch's assignment to Hippias of Elis the distinction of first compiling a list of winners would suggest that we too should be very dubious about chronographic evidence from Olympiads much before the middle or beginning of the fifth century.[8]

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[1] Although he is not completely consistent, Diodorus in general uses the Attic year as a basis for chronology, recording the Roman consuls elected in a given Attic year, and recording the holding of the quadrennial games in the Attic year in which they came. The relative closeness of Olympian and Attic years, and the indication of change of archon given by Diodorus, makes it possible to identify the individual years of each Olympiad.

[2] Cf. Ginzel II, p. 355.

[3] Ascertainable from different evidence, *inter* alia, epigraphical and literary.

[4] The construction of the Christian Era, by Dionysius Exiguus, with year 1 *ab incarnatione Domini* = end of Ol. 194, 4 and beginning of Ol. 195, 1, also yields 776 as the epoch. That this was the epoch in use in Hellenistic times is amply illustrated: cf. *P. Oxy.* 12 (*F. Gr. Hist.* 255, placing, e.g., the death of Alexander the Great in Ol. 114, 1, as does Diodorus, XVII, 113ff. The agreement shows that the same chronographic framework as that demonstrated for Diodorus was accepted by the author of the Oxrhynchus papyrus. The reconciling of Olympiad reckoning with other forms of national years naturally involves discrepancies between the terminations of the different years. E.g., in the reconcilation of Olympiad with Roman consular years, two of which extend across a single Olympiad year, one may reach either 775 or 776, but in both cases the same epoch is indicated; cf. Bickerman, *Chronology* 1968, p. 76. This epoch seems to have been the basis of all professional chronography in Roman as well as Hellenistic times; although there is evidence for local reckonings which used an epoch of 1581/80 B.C. (cf. Ginzel II, p. 358, and *Zeitschr. f. Pap. u. Epigr.* I, 1967, pp. 107–109) this had no effect on chronography in general.

[5] Cf. L. Moretti, *op.cit.*

[6] *Ibid.* p. 59.

[7] Herakles of Ida, brought to Olympia by Rhea as guardian of Zeus, first held the games, matching his brothers in a running race, and held them quadrennially (every fifth year, in Greek counting).

[8] This ascription of the compilation of the list to Hippias fits well what we know of the

The Year and the Time of the Festival

The Olympiad period, and therefore the Olympiad year, depending as it did upon the celebration of the games at Olympia,[1] began at the time of those games. About precise dates for the beginning of the year there has been some discussion, with agreement that it was the summer in general which saw the games and the beginning of the year.[2] The evidence is not abundant. Much of the discussion has depended upon two scholia on Pindar. That on *Ol.* III, 35[3] states that the festival fell at full moon alternatively after 49 and 50 months, in the Elean months of Apollonios and Parthenios, which corresponded to the Egyptian Mesore and Thoth. The Egyptian months, which must be those of the Egyptian calendar fixed to the Roman (see above, p. 177) cover the period 25 July–27 September, and this would seem to delimit the festival nicely. However, the Egyptian months, in a solar calendar, could hardly correspond to a lunar Greek calendar, particularly in an early period, and so this evidence has been combined with other testimony and used variously. Beloch,[4] arguing from literary testimony, concluded that in 480 B.C. Ol.75 began on 21 July or 19 August, that in 428 B.C. Ol.88 began on 14 August, that in 208 B.C. Ol.143 began on 13 July, and that in 44 B.C. Ol.184 began on 29 August, so that in even Olympiads festival came in August while in odd Olympiads it fell in July. These dates could not be proved[5] and Ginzel[6] has set out an argument based on the scholion to Pindar, *Ol.* III, 33. The text of the scholion is by no means reliable, but Ginzel

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organizing of history which was going on at the end of the fifth century. For a comment on this matter, cf. Molly Miller, "The Early Persian Dates in Herodotus," *Klio* 37, 1959, pp. 49–52.

[1] With the order fixed after the games of Ol. 77 (Paus. V, 9, 3).

[2] That it was hot during the games, we learn from Censorinus, *De die nat.* 11.6 (diebus aestivis), Aelian, *Var. Hist.* XIV, 18.

[3] "Οτι πανσελήνῳ ἄγεται ὁ Ὀλυμπιακὸς ἀγὼν ... γίνεται δὲ ὁ ἀγὼν ποτὲ μὲν διὰ τεσσαράκοντα ἐννέα μηνῶν, ποτὲ δὲ διὰ πεντήκοντα, ὅθεν καὶ ποτὲ μὲν τῷ Ἀπολλωνίῳ μηνὶ ποτὲ δὲ τῷ Παρθενίῳ, παρ' Αἰγυπτίοις Μεσωρὶ ἢ Θὼθ ἐπιτελεῖται.

[4] *Griech. Gesch.* I, 2, pp. 139–143.

[5] That for 480 depends upon Herodotus VIII, 12 and 26: the rainstorm at Artemision, a battle certainly fought near the time of Thermopyle if not on the very date as Herodotus says, came in the middle of the summer, τῆς ὥρης μέσον θέρος (VIII, 12) and the Olympic games deterred many Greeks from sending troops to Thermopyle, so that the games must have come either at the full moon of 21 July or 19 August. For 428, after Ol. 88 (Thuc. III, 8) the Mytilenean embassy met with the Spartans, and that meeting came just before mention of the harvest (III, 15) and before mentioning of the beginning of fall (III, 18) so that it could be at the earliest the full moon of 14 August. For 208 B.C., Beloch reasoned that since Livy XXVIII, 5, said that the grain in the Malian Gulf was almost mature (mid-May), and that the period between that and Philip's expedition to the Peloponnesus shortly before the Olympic festival could not have been more than one or two months, thus Ol. 143 must have been a celebration culminating at the full moon of 13 July 208. In 44, Beloch reasons: since Cicero says on 19 August (VIII Idus Sextil., *Att.* XVI, 7) that he was thought in Rome to be on his way to Olympia, that year's games must have been scheduled to culminate on 29 August, the full moon of that month. These arguments, while plausible, are susceptible of different interpretation, and cannot be taken to prove conclusively the celebration of a set of games in a single month.

[6] II, pp. 353–356, based on L. Weniger, "Das Hochfest des Zeus in Olympia," *Klio* 5, 1905, pp. 5–8.

accepted the text to mean[1] that the five year period[2] (i.e. also, the year) began at the new moon of the Elean month "Thosythias," about the time of the winter solstice, and the first Olympic games were celebrated in the 8th month; thereafter it was celebrated alternately in ὀπώρα and at the heliacal rising of Arcturus. Ginzel reasoned on the basis of this that since in 776 the eighth month after the winter solstice would be August, and that because in 700 B.C. the heliacal rising of Arcturus would be 17 September, the celebrations must have fallen at the full moon of August in odd Olympiads and at the full moon of September in even Olympiads.

Raphael Sealey turned to the problem in 1959,[3] and noted that the terseness and corruption of the scholion on Pind. *Ol.* III, 33 make the use of it difficult and the interpretation uncertain, while the accuracy of the scholion on Pind. *Ol.* III, 35, which Ginzel used to place the celebrations between 25 July and 27 September, cannot be gauged.[4] Sealey chose to return to the July-August celebrations of Beloch, citing the demonstration of Labarbe[5] that the battle of Thermopyle was fought at the time of the heliacal rising of Sirius, around July 30. Sealey argued that with the battle fought at the end of July, the festival which prevented the arrival of troops must have been that of full moon of 21 July. Sealey argued that with at least one celebration demonstrably in July we may return to Beloch's conclusion that the celebrations were alternately in July (odd Olympiads) and August (even Olympiads).

Actually, any dependence upon the scholia places us in difficulty. The clearest scholion, that on Pind. *Ol.* III, 35, seems to be reasonably clear in setting up an octaeteris of 99 months divided into two Olympiads of 49 and 50 months, with the celebrations in Apollonios and Parthenios. However, that the scholiast either did not understand what all this meant, or was at best approximating, is illustrated by his drawing the analogy between the Elean months and the Alexandrian Mesore and Thoth. For the Olympiad octaeteris to work the months would have to be lunar, and they could not possibly accord precisely with the Alexandrian months. Further, the same scholiast's attempt in the comment to *Ol.* III, 33, even were it not corrupt, can only make us think that he is totally confused, as analysis reduces the data in the two scholia to calendaric gibberish. That on *Ol.* III, 33 seems to say that the first month of the year was Thosythias, and that this month began around the time of the winter solstice. Now if the first month could be said to begin (presumably regularly) around the time of the winter solstice (or at any specific time) and if the year was regulated by an octaeterid cycle (Schol. Ol. III, 35) it makes no sense so say that the festival was held alternatively at 49 and 50 month intervals and alternatively in Apollonios and Parthenios. For if the year is arranged to bring the first month back always to the same stellar point, then the years had intercalation of the normal Greek type of doubling a month at the time of intercalation (i.e., an extra month of the same name as that just passed) and the 49th month and the 99th month in such a system would have the (same) name[1]. Thus the scholiast's comment that the year began in Thosythias (and by the same token, that the festival was celebrated in the 8th month) and his comment that the festival was celebrated at 49 and 50 month intervals in Apollonios and Parthenios are mutually inconsistent.[2]

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[1] I reproduce the text of Ginzel, *ibid.*, p. 354, note 2: Περὶ τοῦ χρόνου, καθ' ὃν ἄγεται τὰ 'Ολύμπια καδ' ἑκάστην 'Ολυμπιάδα Κικω μ̃ [Πολέμων, Weniger καὶ Κώμαρχος] ὁ τὰ περὶ 'Ηλείων [Böckh; Sybel τῶν 'Ηρακλείων] συγκατάξας [συντάξας?] φησὶν οὕτω[ς]. πρῶτον μὲν οὖν παντὸς περίοδον συνέθηκεν ἐν τῇ ἡμέρᾳ [A. Mommsen συνέθηκαν νηυμ' ἡμερῶν, ἧς; Unger συνέθηκε νεφιη' ἡμερῶν, ὧν; Weniger πεντετηρίδα'] ἄρχειν νουμηνίαν μηνὸς ὃς Θωσυθιὰς ἐν Ἤλιδι ὀνομάζεται, περὶ ὃν τροπαὶ ἡλίου γίνονται χειμεριναί. καὶ πρῶτα 'Ολύμπια ἄγεται η' μηνί. ἑνὸς δὲ ὄντος διαφερόντων τῇ ὥρᾳ τὰ μὲν ἀρχομένης [A. Mommsen ἀρχόμενα] τῆς ὀπώρας, τὰ δὲ ὑπ' αὐτὸν τὸν ἀρκτοῦρον. ὅτι δὲ [Weniger κατὰ πενταετηρίδα] ἄγεται ὁ ἀγών, καὶ ὁ Πίνδαρος μαρτυρεῖ.

[2] This is Greek count; by our reckoning, it is quadrennial.

[3] "The Olympic Festival of 324 B.C.," *ClRev.* N.S. 10, 1960, pp. 185–186.

[4] Sealey is quite right in his reservation that the equation in the scholion of lunar months with Egyptian solar months cannot be better than approximate. Further, as we note below (p. 192) an equation in late times may not be valid for earlier.

[5] J. Labarbe, "Témoignage de Polyen sur la bataille des Thermopyles," *BCH* 77, 1954, pp. 1–21.

All this confusion can easily be understood if we realize that the Egyptian scholiast was trying to express a situation obscure to him. However, since there are a number of possible resolutions of the inconsistencies by rejection of one or another statement, and since each resolution would involve a different solution to the problem of the beginning of the Olympiad year, the present state of the evidence suggests that none of the evidence of the scholiast can be depended on.[3]

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[1] That is, at the time the 49th month was reached, one intercalation had been made (by repeating some previous month) so that month 49 had the same name as month 12, 24, and 36. When 99 had been reached, there had been two more intercalations, to a total of 3 intercalations, and it too would be a multiple anniversary of the month which was 12. The pattern may be set out as follows for 8 years; the I indicates the extra month:

1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12
I 1 2 3 4 5 6 7 8 9 10 11 12 (49 months)
1 2 3 4 5 6 7 8 9 10 11 12
I 1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12
I 1 2 3 4 5 6 7 8 9 10 11 12 (99 months).

[2] Further, one may well suspect that the statement in Schol. Ol. III, 33 that the first month came at the time of the winter solstice was true in late times, and this would invalidate Ginzel's calculations for the first Olympiad. How would the scholiast really know when the Elean year began in 776 B.C.? It is much more likely that he was saying when it began, but that the period reflected was his own.

[3] (1) If the situation (misunderstood by, or badly expressed by the scholiast) was that the Elean *year* operated as an octaeteris, while the festival fell alternatively in the two months, we should be forced to believe that the festival fell at a fixed point in the astronomical year (e.g., the first full moon after the summer solstice) while the two months switched back and forth around it as they naturally would, alternatively delayed and accelerated by intercalation. In this interpretation, the citation of the equivalents of Mesore and Thoth to the Elean months could be explained as arising from use of the later tables of equivalents (cf. hemerologia) without reference to the actual times of the Elean months in earlier times.

(2) Alternatively, the introduction of the alternation between Apollonios-Parthenios equated to Mesore-Thoth may reflect a period in which the Elean calendar had become assimilated to the julian in the manner of the Alexandrian, while the games themselves followed a lunar religious octaeteris which oscillated across the julian year. In this case we should suppose that the festivals fell in a single Elean month, which oscillated, and we might accept the evidence of Mesore-Thoth 25 July–27 September, at least for later times.

(3) Even greater misunderstandings by the scholiast are possible. The festival may have fallen in a single Elean month, with the year on an octaeterid system, and lunar, but the scholiast might have misunderstood the effect

Bickerman[1] concluded that it is "not possible" to be more exact than midsummer. The only really satisfactory evidence (Hdt. VII, 206 and VIII, 26) shows that the festival fell in midsummer, probably in July in 480 B.C. Finally, whether it fell at a fixed point in the summer or oscillated with respect to julian months, we are probably safe in accepting the evidence that the festival culminated with the full moon.[2]

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of the octaeteris, and *thought* that its effect would be to cause the festival to fall in different months. The equation to the Alexandrian calendar then may have been approximate only, perhaps true, more or less for his own time, or for some time from which he had information, or based on some form of table of equivalences.

The first of these alternatives is the most attractive, since, with the games attended from all over Greece, the scheduling according to an Elean calendar would create all sorts of difficulties, whereas if the games always took place according to a fixed, observable astronomical phenomenon, all Greeks would know when the games were to be. Admittedly, the notion that the games took place according to such a fixed point would conflict with Beloch's interpretation of Thucydides (which really forces the text into too strict an interpretation) and of the events of 44 B.C. as reflected in Cic. *Ad Att.* XVI, 7, which looks as though the games were to be held in August, but which nevertheless could easily be understood to refer to an earlier time in Cicero's trip.

[1] *Chronology* 1968, p. 76.

[2] It should be noted, however, that it is not always safe to assume that an ancient source used the summer to summer period for the Olympiad year. For example, Polybius tried to keep each campaign season in one year, and therefore in general closed an Olympiad year and began a new one not in summer, but at the end of campaigning in the fall, thus coinciding with the Aetolian civil year. (Cf. F.W. Walbank, *An Historical Commentary on Polybius*, pp. 35–37, q.v. *passim* for comments on specific chronological problems; Further, see more recent discussion of Polybian dating by P. Pedech, *La Methode historique de Polybe*, Paris, 1964, with the refutation by R.M. Errington, *JRS* 57, 1967, pp. 96–108, as well as the discussion by K. Abel, "Der Tod des Ptolemaios IV. bei Polybius," *Hermes* 95, 1967, pp. 72–90.) Diodorus, on the other hand, used the Attic year as a basis, adapting Olympiad years and the election of Roman consuls to that (see above, p. 190, note 1).

Porphyry, who used Olympiad years (summer to summer, like the Athenian year, cf. Jacoby, *Komm. F. Gr. Hist.* 260, p. 885) for some of his chronological reckoning, also used years of other type, and so too must be subjected to scrutiny before use.

Eusebius seems to have equated the Olympiad year to the julian, beginning January 1; this is best illustrated by the notation in the Canon for the death of Julius Caesar. Opposite Caesar's year 5 appears the notation that he was killed on the Ides of March (March 15) and the notation of Ol. 184 precedes the notation and also the numeral for the fifth year. Now Ol. 184, 1, on the summer-summer reckoning, would have begun in summer of 44, and the fact that it begins before Caesar's death shows that the year began before March – thus fitting a January to December period for Eusebius' Olympiad year.

In the Armenian version, however, Caesar's death is given in Olympiad 184, 2, with precisely the same arrangement as that in the Latin version of Jerome. It would seem, then, that the same equation of Olympiad to julian year is reflected in the Armenian version, with, however, the epoch being 777 B.C. (cf. Bickerman, *Chronology* 1968, p. 76, for reckoning of the epoch at 777 B.C.

2. *The Athenian Archon List*

The Early Period: To 480 *B.C.*

Athenian tradition reports that after the kings, Athens was first ruled by lifetime archons, then by decennial archons, and last, beginning in the early seventh century, by annually elected archons.[1] From the beginning of the annual archonship with the archon eponymous lending his name to each year, there was the possibility of a list with the names of archons used for the designation of years in a chronology.

The potential of the Attic archon list as a chronological tool was eventually realized. The fullest use of the archon list for dating may be found in the extant books of Diodorus, where beginning with Book 11, each year is designated by its Attic archon in an annalistic style. Diodorus, however, was by no means the first to exploit the list. We are told that Demetrius of Phalerum, among his other accomplishments, produced an ἀρχόντων ἀναγραφή[2] and his authority is called upon by Plutarch.[3] That archon lists were used for chronological purposes by the middle of the fourth century is amply attested by the archon datings of the *Ath. Pol.*, and the Marmor Parium of the next century, with an epoch of 264 B.C., is an example of the format which archon datings might have taken.

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[1] The dates for the lifetime and ten year archons may be calculated from the (variant) versions of Eusebius and Synkellos to yield:

	Euseb. Hieronymos	Eus. Ex. Lat. Barb.	Synkellos	
Medon	1068–1048	1091–1071	1061–1041	
Akastos	1048–1012	1071–1032	1041–1006	
Archippos	1012–993	1032–992	1006–987	
Thersippos	993–952	—	987–947	
Phorbas	952–921	992–959	947–917	
Megakles	921–891	959–931	917–889	Lifetime
Diognetos	891–863	931–903	889–861	
Pherekles	863–844	903–888	861–842	Archons
Ariphron	844–824	888–868	842–822	
Thespieus	824–797	868–828	822–795	
Agamestor	797–777	828–800	797–777	
(Thersippos)	—	800–777	—	
Aischylos	777–754	777–764	777–753	
Alkmaion	754–753	764–754	753–752	
Charops	753–744	754–744	752–743	
Aisimedes	743–734	744–734	742–733	
Kleidikos	733–724	734–724	732–723	10 year
Hippomenes	723–714	724–714	722–713	
Leokrates	713–704	714–704	712–703	Archons
Apsander	703–694	704–694	702–693	
Eryxias	693–684	694–684	692–683	

[2] Diog. Laert. I, 22 (*F. Gr. Hist.* 228, F 1).

[3] *Arist.* I, 2; V, 9.

It has been assumed that archon dating was coincident with the institution itself,[1] and, while is no evidence for dating of inscriptions by archons prior to the fifth century, even such datings do not presuppose the use of archons for historical chronology. Cadoux[2] assumed that an archon list was kept from earliest times, and supplemented annually, provided a reliable guide for dating. The evidence does not make me confident of this assumption.[3] The earliest ancient extant archon list is that published by B.D. Meritt, *Hesp.* 8, 1939, pp. 59–65, dated palaeographically to the twenties of the fifth century and containing parts of the names of six archons of the last quarter of the sixth. While this stone attests the existence of an archon list at the end of the fifth century, there is nothing to show that the list was in existence before. Herodotus dates by an archon only once, to assign the battle of Salamis to the archonship of Kalliades,[4] and with Herodotus' obvious and continuous concern for detailed chronology[5] we might expect him to date by archons more frequently were there a convenient list to refer to.[6] And although Thucydides' strictures against archon reckoning in V, 20 were directed more against the lack of precision in that form of chronology, it is noteworthy that in II, 2, in marking the outbreak of hostilities, he did not seem to be confident of either the general cognizance or the future memory of the Attic archon, and so added other time notes. Furthermore, the creation of lists of this sort seem only to have begun late in the fifth century. It was then that Hippias of Elis compiled his list of Olympic victors, and this seems to coincide with the extant fragment of the Attic archon list. The list of Pythian victors was to wait until Aristotle for compilation. The list of eponyms of Miletus,[1] which go back to 525/4 and down to 31/2, were probably inscribed (and first compiled) in 335/4. All the names prior to that year were carved at one time, presumably in that year, while subsequent names were added individually. The presumption is that the list was first compiled and inscribed in that year. All the evidence would seem to suggest that we should not posit an archon list available at Athens before the latter part of the fifth century.

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[1] Ginzel II, p. 352.

[2] T.J. Cadoux, "The Athenian Archons from Kreon to Hypsichides," *JHS* 68, 1948, pp. 70–123.

[3] F. Jacoby, *Atthis*, Oxford, 1949, arguing in general that the Atthides were based on the work of Hellanicus at the end of the fifth century, is much more sanguine about the antiquity of the list, and makes it Hellanicus' main source. He sees no objection to a theory that "an ἀναγραφή was drawn up in the first half of the seventh century" (p. 173). Jacoby put the right question, p. 174: "what material was at the disposal of the redactor(s) in the fifth century"? I would have no doubt that among the lists available from 480 on, (Jacoby, p. 174) would have been an archon list, but it would seem to me that Jacoby's skepticism about temple lists (pp. 357–358) is applicable to the archon lists as well. Indeed Jacoby's conclusions about Hellanicus' sources (p. 224) really leaves open the question of the historicity of the late fifth century list. That Hellanicus used it and that the nature of the list shaped the form of Hellanicus' and subsequent Atthidographers' work there seems no doubt, but the question relevant to our study is the antecedents to that list.

To deal with that question fairly one must be prepared either to push the keeping of archon records back (i.e., to the seventh century, as Jacoby does) or one must be prepared to argue the construction of the late fifth century list *de novo*, at least from non-documentary sources for the period before the Persian wars, or at least at the very earliest, from non-documentary sources for the period before the end of the tyranny. I am prepared to take precisely that position. While I would concede that the keeping of an annual list was a possibility from the end of the sixth century on, and that documentary records were probably kept from the Persian War on, I would argue that the reconstruction of a list was necessary for the earlier period. The sources for that reconstruction would have been precisely the kind of information which kept the traditions about the Peisistratids alive (Jacoby, pp. 152–168 and esp. 163) until the very end of the fifth century. My own guess would be that the list of the end of the fifth century was in fact the first openly published list; that it was made up by consulting records of the fifth century, which would have been complete; that to the recorded documentation were added calculated positions for archons remembered and reconciliations between memorized lists; that in the calculations of the places for these earlier archons, non-literary, non-chronicle, and non-documentary tradition provided the evidence. Finally, I would suggest that the invention of Hellanicus was made possible only by the introductions of these chronological lists, in Athens and elsewhere, at the end of the fifth century. As Jacoby admits, p. 360, note 49, "Herodotus had no archon list at his disposal".

[4] VIII, 51, 1.

[5] Cf. M. Miller, "The Earlier Persian Dates in Herodotus," *Klio* 37, 1959, pp. 29–52; "The Herodotean Croesus," *Klio* 41, 1963, pp. 58–94; "Herodotus as Chronographer," *Klio* 46, 1965, pp. 109–128.

[6] Jacoby, *Atthis*, p. 350, note 49, adduces

Scholarly study of the archon list has been devoted primarily to reconciling what are apparent inconsistancies in our sources, and it has been assumed that once the official list was published it formed a datum for all subsequent historians.[2] I think that must be so: the archon list provided names for years, and the publication of the list formed a convention. Nevertheless, the difficulties in the sources may rest not only on the difficulty of meaning of texts or possible corruption of manuscripts, but also on later dating of events in the period long before the establishment of the archon-list convention. That is, events and personalities of the sixth century and before will have appeared in 'pre-list' sources (e.g., Herodotus) without archons attached to them, thus undated, archonless. Some of these will have survived in 'post-list' sources undated (thus reducing the number of archon-names preserved) or possibly, dated variously, thus introducing differences in the equations. To the ancients, listing an event under two archons meant a dispute about the date of the event. All too often, we take it as a dispute about the name of the archon in office at the time of the event. Finally, apparent disagreements in the sources may be due to different kinds of years used, and a source may be reckoning in, e.g., the Roman year, and giving cross-dating in the archon year, which covered different starting and end points, and the different years used may cause an 'oscillation' of information, making it appear that a writer is referring to a year earlier or later than the year to which he actually intended to refer. Since the divergencies almost always deal with the period of the sixth century and earlier, and probably were caused by an attempt to reconcile undated, i.e., archonless, events with the list once established, these difficulties in the material of the early period also suggest a late date for the publication of the list.

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that Herodotus had no archon list by Herodotus' inability to date Solon or Cylon, or to indicate intervals of years for them.

[1] *Milet* I iii, 1914, pp. 254–275. See Jacoby's discussion, p. 180, and 357–358.

[2] Thus Jacoby, *Atthis*, Oxford, 1949, p. 171, can subscribe to the view that the Atthides were consistent with regard to the archon list.

In the list which follows I have tried to give the evidence for the placement of each archon in the list, and have tried to sketch briefly the arguments for dating where it seemed to me that argument was warranted. I would judge that very few of the archons are placed with sufficient certainty for us to use them as they were intended, i.e., as dates, and we are still at the stage of scholarship in which we are struggling to restore the official list.[1] That official list, I should like to emphasize, was a list of archons for dating purposes, and the archons' names were dates. The objective historicity of that list, at least for the early period, must have been dubious in modern terms, and that dubiety would obtain for the restoration here, regardless of how close it may approximate the fifth century list.

Ol. Year

24,2 683/2 Kreon: So Jerome, *Canons*, with no ms. variants; a. Abr. 1333 is last year of decennial archons, and Ol. 24,2 is first year of annual archonships. Armenian version also gives a. Abr. 1333 as last year of decennial archons, but = Ol. 24,2, and from that year the inception of annual archonships depends. Kastor, *F.Gr.Hist.* 250, F 4, has Kreon in Ol. 24. *Mar. Par.* 32, in year 420, beginning of annual archons (263/2+420=683/2). Dion. Hal. I, 71, 5 can be understood to reflect a chronology with first annual archon in 683/2: Rome founded in 432nd year after fall of Troy (1184/3—432 = 752/1, with year given in dative; that year ran concurrently with Ol. 7,1 with year given in genitive + ἐνεστῶτος, and it was also the first year of Charops, the first of the seven decennial archons, which must be 753/2 if the first annual archon is to be 683/2. Now, if the year of the founding of Rome, which was the 432nd year from the fall of Troy, is taken as the Roman calendar year beginning Jan-Mar., or the year beginning with the Paralia, April 21, that year overlaps the end of the first year of Charops, 753/2, and the beginning of the Olympic year Ol. 7,1, 752/1. This is emphasized by the use of ἐνεστῶτος, and we can see that in Dionysius' chronology, Charops was 753/2, and after the seven decennial archons (753/2—70 = 684/3) the next year, 683/2, was the first annual archon.

Synkellos' chronology does not agree; p. 400, ed. Dind., Kreon is given as Ol. 25 or 18. But Synkellos also reports 23 additional life-archon years κατά τινας (p. 368) and the discrepancy for Kreon is probably based on computation, perhaps in an attempt to reconcile variant traditions of elapsed time. Pausanias' attributions of the decennial archons would put the first annual archon in 687/6: in IV, 5, 10, the 5th year of Aisimides is put in Ol. 9,2, i.e., 743/2, and in IV, 13, 7, the 4th year of Hippomenes (4th year completed seems to be Ol. 14,1) is Ol. 14,1 = 724/3). But the canonical dates for these would be 739/8 for Aisimides 5, and 720/19 for Hippomenes 4, so that Pausanias is consistently four years early for these two. There seems to be a false equation into Olympiads for the early Attic list, perhaps by an erroneous insertion of one Olympic victor in the Olympic list, and we may take the testimony of Pausanias to reflect the same *Attic* list with the same time lapses, but thrown off by the false equation into Olympiads.

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[1] A number of lists have been presented, some covering not only the early period, but the entire list. Cf. 'Archontes," *RE* II, 1896, pp. 581–598; Kirchner, *Prosop. Att.* II, 1903, pp. 631–652; Ginzel II, 1911, Tafel VI; Beloch, *Gr. Gesch.* I, 2, 1913, pp. 155–170; Hiller, in *IG* I^2, 1924, pp. 267–301. Cf. also, as an examination of the list in antiquity, Jacoby's reconstruction of Apollodorus' archon-list, in *Apollodors Chronik, Philologische Untersuchungen* 16, 1902, pp. 403–413, and the argumentation *passim*. The most recent discussion of the early list is by T.J. Cadoux, "The Athenian Archons from Kreon to Hypsichides." *JHS* 68, 1948, pp. 70–123, subsequently discussed by G.V. Sumner, "Problems in Aristotelian ΑΘΗΝΑΙΩΝ ΠΟΛΙΤΕΙΑ," *ClQuart.* NS 11, 1961, pp. 31–54.

24,3	682/1	Lysia(des): *Mar. Par.* A 33, 418th year (264/3 + 418 = 682/1). Placed in this year to avoid conflict with Tlesias, who is probably not the same man.
24,4	681/0	Tlesias: Pausanias, IV, 15, 1, places him in Ol. 23,4 = 685/4. As this predates the first annual archon, and because Pausanias' text is perfectly consonant with interpretation of Tlesias as a follower of the first annual archonship, I take it that this Olympiad equation is also a false one, as above, and that we have consistently, here, the four year error, so that Tlesias is to be placed in a year four years later.
25,1	680/79	
25,2	679/8	
25,3	678/7	
25,4	677/6	
26,1	676/5	
26,2	675/4	
26,3	674/3	
26,4	673/2	
27,1	672/1	
27,2	671/0	Leostratos: Dionysius' archon-Olympiad equations are canonical as here, III, 1, 3, and there are no difficulties as above, in which the Roman year was involved, and the canonical quality of the equations strongly supports the conclusion reached whereby Charops had his canonical year 753/2, and the first annual archon was the canonical 683/2.
27,3	670/69	
27,4	669/8	Peisistratos: Pausanias II, 24, 7, with the Ol. number restored; here as in the following dates of Pausanias, it may be that the four year error in the equation of archon-Olympic year still applies and that these archons should be dated 4 years later.
28,1	668/7	Autosthenes: Pausanias IV, 23, 4.
28,2	667/6	
28,3	666/5	
28,4	665/4	
29,1	664/3	Miltiades: Pausanias IV, 23, 10.
29,2	663/2	
29,3	662/1	
29,4	661/0	
30,1	660/59	
30,2	659/8	Miltiades: Pausanias VIII, 39, 3.
30,3	658/7	
30,4	657/6	
31,1	656/5	
31,2	655/4	
31,3	654/3	
31,4	653/2	
32,1	652/1	
32,2	651/0	
32,3	650/49	
32,4	649/8	
33,1	648/7	
33,2	647/6	
33,3	646/5	
33,4	645/4	Dropides: *Mar. Par.* A 34, year 381 (264/3 + 381 = 645/4).
34,1	644/3	
34,2	643/2	
34,3	642/1	
34,4	641/0	
35,1	640/39	
35,2	639/8	Damasias: Dion. Hal. III, 36, 1.

35,3	638/7	
35,4	637/6	
36,1	636/5	Hippias, *FHG* II, p. 14, F 5, mentions an Epainetos as king in Athens in Ol. 36, when Arytamas the Laconian was victor. But Arytamas does not appear in the list, and Eusebius has Phrynon of Athens as victor in Ol. 36; Phrynon called victor in Pankratia by Diog. Laert. I, 74. Epainetos may have been archon basileus. It should be noted that: Plutarch, *Sol.* 12 speaks of Megakles as the assassin of Kylon; that Thucydides I, 126, speaks of Kylon as an Olympic victor, (Eusebius, Ol. 35 = 640–36: in rough agreement with Aristotle, *Ath. Pol. ad init.*, which places the killing of Kylon before Drakon, i.e., presumably before 624/3) which allows him to have been victor before the conspiracy, and also makes the assassination an action taken by the nine archons, leading scholars to combine the evidence of Plutarch and Thucydides to produce an archonship of Megakles. Mabel Lang, *ClPhil.* 62, 1967, pp. 243–249, points out the development of the Alkmaionid versions: from Herodotus' account, V, 71, we learn of the curse on the Alkmaionidai but with the killing done at the hands of the prytanies of the naucraries; the archons introduced by Thucydides; resolved as Megakles by Plutarch; she explains this development of the account as Alkmaionid propaganda to make the murder legal and proper. This and the appearance of Megakles' name in Plutarch suggests that his role and position as archon must have been part of the story and regardless of the official list, probably by Thucydides' time and certainly by the time of Plutarch. I think that we cannot even guess about the official list; we cannot know if Epainetos was on it, whether Megakles too was on it; whether both might have been on it.
36,2	635/4	
36,3	634/3	
36,4	633/2	
37,1	632/1	
37,2	631/0	
37,3	630/29	
37,4	629/8	
38,1	628/7	
38,2	627/6	
38,3	626/5	
38,4	625/4	
39,1	624/3	Aristaichmos: Archon during the year of Drakon, *Ath. Pol.* 4,1. Drakon dated to Ol.39,1 by Tatian, *Orat, ad Graec.* 41; Clement, *Strom.* I, 80, 1; the Suda, s.v.; most mss. of Jerome place Drakon in Lyd. Sadyattes 3 (= a. Abr. 1393 = Ol. 39, 1); mss. of Armenian version differ between placement in a. Abr. 1395 (Ol. 39, 3 = 622/1) and 1396 (Ol. 39, 4 = 621/0).
39,2	623/2	
39,3	622/1	
39,4	621/0	
40,1	620/19	
40,2	619/8	
40,3	618/7	
40,4	617/6	
41,1	616/5	
41,2	615/4	Heniochides: Dion. Hal. III, 46, 1.
41,3	614/3	
41,4	613/2	
42,1	612/1	
42,2	611/0	
42,3	610/09	
42,4	609/8	
43,1	608/7	

43,2	607/6	
43,3	606/5	
43,4	605/4	Aristokles: *Mar. Par.* A 35, year 341 (264/3 + 341 = 605/4).
44,1	604/3	
44,2	603/2	
44,3	602/1	
44,4	601/0	
45,1	600/599	
45,2	599/8	. . . Kritias: *Mar. Par.* A 36, but with year number lost. Between Aristokles, A 35, and Simon, A 37 (= 591/0).
45,3	598/7	
45,4	597/6	Ky]pselo[s: Archon List, *Hesp.* 32, 1963.
46,1	596/5	Te]lekle[: Archon List, *Hesp.* 32, 1963.
46,2	595/4	Phi]lomb]rotos: Archon List, *Hesp.* 32, 1963; Philombrotos, Plutarch *Sol.* 14, 3.
46,3	594/3	Solon: Sosikrates, *ap.* Diog. Laert. I, 62. Jerome, a. Abr. (Lyd. Alyattes 18) 1423 most mss., (with variants indicating a. Abr. 1421 = Ol. 46, 1; 1424 = Ol. 46,4; 1426 = Ol. 47, 2) Armenian Version a. Abr. 1426, 1427). Ol. 46, Tatian, *Orat. ad. Graec.* 41. Clement, *Strom.* I, 65, 3. Suda, s. v., γέγονε δὲ ἐπὶ τῆς μζ ὀλυμπίαδος, οἱ δὲ νς′, is clearly writing of the man, not the archonship; E. Rohde, "Γέγονε in den Biographica des Suidas," *Rhein. Mus.* 33, 1878, pp. 161–220, showing that γέγονε generally means "die Zeit der Blüte" (definitely in 88, probably in 17 more, cases out of 129), and a by-product of that examination shows that the Suda is dealing with the lives of people, and so would in the case of Solon be suggesting dates for the man, not the archonship; the second date Ol. 56 (= 556–552) may not be a manuscript error or the date of Solon's death (cf. Rhode, *op.cit.* p. 138–139) but may reflect scholarly controversy over the date of the man's activity: cf. Plut. *Sol.* 27, discussing the Herodotean account of the meeting with Croesus. *Ath. Pol.* 14,1 puts the coup of Peisistratos, in the archonship of Komeas, in the 32nd year after the nomothesias of Solon, and this has been taken to put the archonship in 592/1. There have been various resolutions of this, including emendation of the *Ath. Pol.*, or, less dependent on textual emendation., suggestion of intrusion of two names into the list, G. Sumner, *ClQuart.* N.S. 11, 1961, pp. 49–54. M. Miller, *Arethusa* I, 1968, pp. 62–81, suggests that the link was not the archonship but the end of the period of reform, and that the period lasted into the years following the archonship (Plut., *Sol.* 5, has Solon still making laws during Anacharses' visit, see below, 592/1), so that when the dating was made with access to the archon list, Aristotle's 32 years began two years after the year called Solon. The tradition is firm enough for 594/3, so that we must either reinterpret *Ath. Pol.* to allow that year, or emend it.
46,4	593/2	Dropides: Philostratos, *VS* I, 16, 2: "after Solon." Phormion: Schol. Aristophanes *Pax* 347: "after Solon."
47,1	592/1	Eukrates: Diog. Laert. I, 101: Ol. 47, archon at the time when Anacharses visited Athens.
47,2	591/0	Simon: *Mar. Par* A 37, year 327 (264/3 + 327 = 591/0).
47,3	590/89	
47,4	589/8	*Ath. Pol.* 13 states that in the 5th year after the archonship of Solon, οὐ κατέστησαν ἄρχοντα. If Aristotle was indeed counting from 594/3, and counting inclusively, this would have happened in 590/89, and if the verb means elect, the anarchy would have been in 589/8; if the verb means "have an archon," counting inclusively the anarchy would have been 590/89 in the list; counting exclusively, the respective meanings of the verb would yield 588/7 and 589/8, respectively. Only the interpretation giving 588/7 would seem to be conclusively excluded, as that year is occupied.
48,1	588/7	Philippos: Clement, *Strom.* I, 127, 1. Synkellos, ed. Dind. p. 429.
48,2	587/6	If *Ath. Pol.* 13, 1 is taken as counting from the base of 592/1, this is the year of

		the first anarchy ± 1, by the same possible interpretations of the text, but with preceding and following years possibly excluded by occupation.
48,3	586/5	Damasias?: Cf. M. Miller, *Klio* 37, 1959, p. 46f. arguing for this date, briefly, as follows: the scholiasts to Pindar date the fall of Kirrha to archonship of Simon, 591/0, and that six years later, the games were re-established (or the remnants were beaten) in the archonship of Damasias. Counting inclusively, ἔτει ἕκτῳ, that would put the archonship of Damasias in 586/5, *pace Mar. Par.* A 38, which is taken as error (see below). This would mean that the second *Ath. Pol.* 13 anarchy, taken by this argument to be the 5th year from 589/8, was the year after Damasias; i.e., his second year was not from election, and it is for this reason that *Ath. Pol.* 13 has the curious phrase διὰ τῶν αὐτῶν χρόνων for Damasias, meaning that for the same period he exercised the office, that period including 586/5 and 585/4, the year of the second anarchy.
48,4	585/4	Anarchia: on the above argument; the second year of Damasias.
49,1	584/3	Ten archons: after 2 months of Damasias, *Ath. Pol.* 13, 1, dated to this year on the above argument.
49,2	583/2	Damasias: The argument for this dating: *Mar. Par.* A 38 has Damasias τοῦ δευτέρου in year 318 and that should be (264/3 + 318 =) 582/1. That means the second year of Damasias, and is the year of the second anarchy in *Ath. Pol.* 13, counting exclusively from 592/1: + 5 = 587/6: + 5 = 582/1.
49,3	582/1	Anarchia: or the second year of Damasias, on the preceding argument.
49,4	581/0	Ten archons: after Damasias' 2 months, on the preceding argument.
50,1	580/79	
50,2	579/8	
50,3	578/7	
50,4	577/6	Archestratides: Dion. Hal. II, 1, 1.
51,1	576/5	
51,2	575/4	
51,3	574/3	
51,4	573/2	
52,1	572/1	
52,2	571/0	
52,3	570/69	Aristomenes: Diog. Laert. I, 79.
52,4	569/8	
53,1	568/7	
53,2	567/6	
53,3	566/5	Hippokleides: *F. Gr. Hist.* 3 F2: archon at institution of Panathenaic games; Jerome, most mss., puts the foundation of the games in a. Abr. 1451 = Ol. 53, 3.
53,4	565/4	
54,1	564/3	
54,2	563/2	
54,3	562/1	
54,4	561/0	Komeas: Komeas = 561/0 is the most common equation, although Cadoux (*JHS* 68, 1948, p. 106) has noted that the argument is a "slender one," and that "560/59 is only slightly less probable." The evidence: *Mar. Par.* A 40, year number 297, one total, on a base of 264/3 (+ 297 =) 561/0, the other, on a base of 263/2 (+ 297 =) 560/59. The archonship is tied to the first year of Peisistratos by the report of *Ath. Pol.* 14, 1 that Peisistratos came to power in the archonship of Komeas, so the calculation must include the data obtainable for Peisistratos. For the first year of Peisistratos, there is confusion in the mss. of Jerome and Eusebius, and although Miller (*Klio* 37, 1959, pp. 44–45) can offer an explanation of the confusion, it is not really possible to argue convincingly from these sources for a date for Komeas. Cadoux has discussed the date from the point of view of the total length of the actual years in tyranny: 33 years, *Ath. Pol.* 17, 1 and *Pol.* 5, 1315b 29–34, as well as Justin II, 8, 10, one ms., or 34 years, other mss. of Justin; the period of tyranny of Hippias was about 17 years, *Ath. Pol.* 19, 6 or 18 years, *Pol.* 5, 1315b 29–34,
55,1	560/59	

and the combined tyrannies of Peisistratos and Hippias were 49 or 51 years, *Ath. Pol.* 19, 6 or 50 years, Eratosthenes, Schol. Aristophanes *Wasps* 502. Taking these data, with a base of 528/7 for the end of Peisistratos and 511/10 for the end of Hippias, Cadoux found that *all* can fit either 561/0 *or* 560/59, by, variously, inclusive or exclusive reckoning (*op.cit.*, p. 105). Cadoux opted for 561/0 to have a string of 264/3 base reckonings in *Mar. Par.*, his "slender" argument. Sumner, *ClQuart.* N. S. 11, 1961, pp. 37–40, accepts the base date for the beginning of the tyranny as 561/0, and finds that this works for counting backwards each of the periods of tyranny, 5 years (*Ath. Pol.* 14, 3), 6 years, (*Ath. Pol.* 15, 1) and 8 years, calculated by Sumner, and makes the first return after exile in the fifth year after the first exile began, by emending 14, 4, ἔτει δὲ δωδεκάτῳ to ἔτει δὲ πέμπτῳ, (*pap.* ετει δ' δ. . .κατωι) (suggested in a note in Kaibel and Wilamowitz' edition, Berlin 1891). Miller, (*op.cit.* p. 43) has shown how, with a base date of 560/59, all the data of *Ath. Pol.*, taking the "twelfth year" in 14, 4 relatively loosely, and counting it from the beginning, as well as that of *Politics* and the 36 years of the Peisistratids in Herodotus V, 65, 3, can be reconciled. There is, I think, good reason to incline towards a solution that does not require emending 14, 1, as, regardless of what tradition may (hypothetically) lie behind the text of *Ath. Pol.*, that number is written out in that text and is not a numeral, and we do not have before us a numeral which might have been easily corrupted, but the full word. That the text on which *Ath. Pol.* is based also had the full word is more likely, on balance, as this text has *iota* adscript, suggesting that its exemplar was Ptolemaic, with the word written out with *iota* adscript, as the adscript is rather less likely to have been introduced in the first century of our era.

55,2	559/8	Hegestratos: Followed Komeas, Plut. *Sol.* 32, 3, and to be placed according to the placement of Komeas.
55,3	558/7	
55,4	557/6	
56,1	556/5 ╳	Euthedemos: *Ath. Pol.* 14, 3, Hegesias = date of Peisistratos' first exile, in 6th
56,2	555/4	Hegesias: year after Komeas; Euthedemos, year 292 *Mar. Par.* A 41 = (263/2 + 292 = 555/4) or (264/3 + 292 = 556/5). If Komeas = 560/59, then Hegesias = 555/4, and Euthedemos = 556/5, with *Mar. Par.* base date of 264/3, while if Komeas = 561/0, Hegesias = 556/5 and Euthedemos = 555/4, with *Mar. Par.* base date of 263/2.
56,3	554/3	
56,4	553/2	
57,1	552/1	
57,2	551/0	K[: Archon List, *Hesp.* 32, 1963.
57,3	550/49	Phạ[: Archon list, *Hesp.* 32, 1963.
57,4	549/8	Te[: Archon list, *Hesp.* 32, 1963.
58,1	548/7	Erxikleides: Pausanias X, 5, 13 + Archon List, *Hesp.* 32, 1963.
58,2	547/6	Thes[: Archon list, *Hesp.* 32, 1963.
58,3	546/5	P̣ḥ<o>ṛ[: Archon list, *Hesp.* 32, 1963.
58,4	545/4	
59,1	544/3	
59,2	543/2	
59,3	542/1	
59,4	541/0	
60,1	540/39	
60,2	539/8	
60,3	538/7	
60,4	537/6	
61,1	536/5	. . . naios I: *Mar. Par.* A 43, year number partly lost, but placement between fall of Sardis and accession of Darius, and dates the first acting of Thespis. The Suda places first acting of Thespis in Ol. 61.

61,2	535/4		
61,3	534/3		
61,4	533/2	Therikles:	Dion. Hal. IV, 41, 1; Diod. Sic. X, 3, 1, Ol. 61, year unspecified.
62,1	532/1		
62,2	531/0		
62,3	530/29		
62,4	529/8		
63,1	528/7	Philoneos:	*Ath. Pol.* 17, 1:death of Peisistratos and accession of Hippias in archonship of Philoneos; termination of Hippias' tyranny is firmly placed in archonship of Harpaktides, *Ath. Pol.* 19, 6, and that is fixed in 511/10 (see below); *Ath. Pol.* 19, 6 further gives the period involved as "about 17 years", and Aristotle, *Pol.* 5, 1315b 29–34, calls the period 18 years. These two can be reconciled, with 18 inclusive count, and "about 17" giving whole years, only if the beginning, and therefore the archonship of Philoneos, is 528/7. The mss. of Jerome are varied, not of conclusive use, giving for the sons' accession a. Abr. 1489=Ol.63, 1, but also a. Abr. 1490, 1491, 1492, 1494, 1495, 1496, 1487; The Armenian version is a little better, giving a. Abr. 1490, others with 1489 = Ol. 63, 1.
63,2	527/6	On]eto[r:	Five names appear on the fragmentary archon list, *Hesp.* 8, pp. 59–65, and they are placed in the canon by Dion. Hal. VII, 3, 1, who dates Miltiades in Ol. 64. Although Dionysius does not specify the year, subsequent archons (see below) are all those of the first year of an Olympiad, and that may be taken to be the case here. The last name may be that of Peisistratos son of Hippias, who, according to Thucydides VI, 54, 6, was an archon, probably during the tyranny and not the restored democracy, as Thucydides reports his name erased from an inscription.
63,3	526/5	H]ippia[s:	
63,4	525/4	K]leisthen[es:	
64,1	524/3	M]iltiades:	
64,2	523/2	Ka]lliades:	
64,3	522/1	]strat[:	
64,4	521/0		
65,1	520/19		
65,2	519/8		
65,3	518/7		(The Habron proposed by Cadoux for 518/7 should probably be excised: the statement of Eustathius (Schol. vet. Pind. ed. Drachmann III, p. 296) that Pindar was born in the archonship of Abion (Habron) (birth = Ol. 65, Suda), so that Habron = Ol. 65, is based on Eustathius' misunderstanding of Thomas Magister, Drachmann I p. 7, that Pindar *died* in the archonship of Abion. That Pindar was thought to have died in the archonship of Habron is shown by *P. Oxy*, 2438, which contests that fact. A Habron-Abion at the birth of Pindar does not pertain.)
65,4	517/6		
66,1	516/5		
66,2	515/4		
66,3	514/3		
66,4	513/2		
67,1	512/1		
67,2	511/0	Harpaktides:	Archon at expulsion of Peisistratids, *Mar. Par.* A 45, year 248 (+263/2=) 511/0; in 4th year before archonship of Isagoras, *Ath. Pol.* 21, 1; 4th year after murder of Hipparchos in Panathenaia (514/3), Herodotus V, 55; Thucydides I, 20, 2; 6, 56, 2; *Ath. Pol.* 18, 3 and 19, 2; Thucydides' 20 years after expulsion of Hippias for Marathon, in VI, 59, 4, is probably a round number.
67,3	510/09	Skamandrios:	Placed by guess. Andocides, *Myst.* 43, reports the banning of torture under Skamandrios; Hippias used torture on Aristogeiton in 514/3, Thuc. VI, 57 and *Ath. Pol.* 18, 4, and it seems reasonable to put the banning of torture right after the expulsion of Hippias.
67,4	509/8	Lysagoras:	*Mar. Par.* A 46, year (uncertain) 246 (+263/2=509/8).
68,1	508/7	Isagoras:	Dion. Hal. I, 74, 6; and V, 1, 1 gives Ol. 68 only.
68,2	507/6	Alkmaion:	Pollux 8, 110, as date of the beginning of the 10 tribes. The reform

took place in the archonship of Isagoras, *Ath. Pol.* 21, 1; perhaps Pollux took his data to mean that the 10 tribes first functioned under Alkmaion, in the year after Isagoras, or, (less likely?) that Alkmaion took over the year of Isagoras after Isagoras fled. In the latter case, only one name ought to have stood on the list, and we have both, so that Alkmaion may be taken to follow Isagoras in the next year.

68,3 506/5
68,4 505/4

69,1 504/3 Akestorides: Dion. Hal. V, 37, 1, Ol. 69, unspecified year. Dionysius, in this group of archons, gives the Olympiad, the victor, and the Athenian archon, apparently giving the archon of the year of victory, i.e., the first year of each Olympiad. This is confirmed by the facts that (a) the first of the group, Isagoras, is definitely in the first year of his Olympiad (Dion. Hal. I, 74, 6) and (b), the last of the group, will only fit into the first year of his Olympiad.

69,2 503/2 Hermokreon: *Ath. Pol.* 22, 2: πρῶτον μὲν οὖν ἔτει πέμπτῳ μετὰ ταύτην τὴν κατάστασιν referring to the reforms of Kleisthenes in the archonship of Isagoras, 508/7. Following a policy of not emending *Ath. Pol.*, it is possible to make sense and consistency of the numbers: in the fifth after Isagoras (508/7), exclusive count produces 503/2 for Hermokreon, in whose year the bouleutic oath was introduced. Then, ἔπειτα, proceeds *Ath. Pol.*, they chose generals by tribes, and ἔτει δὲ μετὰ δωδεκάτῳ they won the battle of Marathon in the archonship of Phainippos. The twelve years involved has been taken to describe the period Hermokreon-Phainippos, and there is no way to do that and preserve the 5 year period Isagoras-Hermokreon. But if the 12 year period begins from the time indicated by ἔπειτα, i.e., the choosing of generals by tribes being *after* Hermokreon, even by one year, we can make the numbers consistent. In this reconstruction the election of generals by tribes then comes in 502/1, and the 12 years from Hermokreon, becomes rather, twelve years from 502/1 to Phainippos, and this works, by exclusive count. I prefer this solution, leaving the text as it stands, and as I see the text of *Ath. Pol.*, I do not consider that the main consideration of the author was *clear* chronology, as that could have been determined by reference to an archon list. So long as the text can make sense, I would accept it.

69,4 501/0
70,1 500/499 Smyros: Dion. Hal. V, 50, 1, Ol. 70, year unspecified.
70,2 499/8
70,3 498/7
70,4 497/6 Archias: *P. Oxy.* 2438: 40th from Habron (458/7).
71,1 496/5 Hipparchos: Dion. Hal. VI, 1, 1, Ol. 71, year unspecified.
71,2 495/4 Philippos: Anon., *Vit. Sophokles* 2 (ed. A.C. Pearson).
71,3 494/3 Pythokritos: *Mar. Par.* A 47, year 231 (+263/2=494/3.
71,4 493/2 Themistokles: Dion. Hal. VI, 34, 1.
72,1 492/1 Diognetos: Dion. Hal. VI, 49, 1, Ol. 72, year unspecified.
72,2 491/0 Hybrilides: Dion. Hal. VII, 1, 5; Pausanias VI, 9,5.

72,3 490/89 Phainippos: = Marathon: *Ath. Pol.* 22, 3; Plutarch, *Arist.* 5, 9; *Mar. Par.* A 48 τ̣[ο]ῦ̣ δευτέρου [Φ]α̣[ι]ν[ι]π[πίδ]ου, year 227 (+263/2=490/89); Archon list, *Hesp.* 8, pp. 59–65.

72,4 489/8 Aristeides: *Mar. Par.* A 49, year 226 (+263/2=489/8).
73,1 488/7 Anchises: Dion. Hal. VIII, 1, 1, Ol. 75, year unspecified.
73,2 487/6 Telesinos: *Ath. Pol.* 22, 3–5
73,3 486/5
73,4 485/4 Philokrates: *Mar. Par.* A 50, year 222 (+263/2=485/4).
74,1 484/3 Leostratos: Dion. Hal. VIII, 77, 1, Ol. 76, year unspecified.
74,2 483/2 Nikodemos: *Ath. Pol.* 22, 7 (see below); Dion. Hal. VIII, 83, 1 (AUC 270).
74,3 482/1

74,4 481/0 Hypsichides: *Ath. Pol.* 22, 8, τετάρτῳ δ'ἔτει, they received back the ostracised, in the archonship of Hypsichides. The fourth year has always been taken to refer back to Nikodemos, three years before, by the longest possible count, and so the text has been emended here. *But*, directly before the introduction of this passage, *Ath. Pol.* has said that ἐν τούτοις τοῖς καιροῖς Aristides was ostracised. Now, remembering that it was easy for *Ath. Pol.* and its contemporaries to find precise dates for anything mentioned, there is no reason to suppose that the ostracism of Aristeides must be put in one of the named years; rather, the vague term used, taken naturally, would indicate that it was in the period under discussion, i.e., probably the period ending with Nikodemos. *Ath. Pol.* would know precisely, and so would anyone else, and if it is put in 484/3, Hypsichides is correctly stated to be in the fourth year from that event. (Whether this explanation of *Ath. Pol.* be accepted or not, the placement of both Hypsichides and Nikodemos is the generally accepted one.)

Archons named or presumed, but undated.

Phainippos I: the archon of 490/89 is called Phainipp(ides) II, and presumes an earlier one.

Kritias: of ca. Ol. 44–47 is called 'the first' implying a subsequent Kritias.

. . . naios II, is suggested by the first . . . naios, ca. 536/5.

Kebris was archon when the statue of Hermes was erected (Philochorus, *FHG* I, p. 397 F 82).

Lakreteides was archon during the reign of Darius. (Philochorus, Schol. Ar. *Ach.* 220).

The Fifth and Fourth Centuries

The extant text of Diodorus, Books 11–20, along with supplements and confirmations from the Marmor Parium and the anonymous Olympiad Chronicle, *P. Oxy.* 12, produce a full list of archons from 480/79 to 302/1. That these three sources, along with others, are in agreement, demonstrates that the list from the fifth century on was well known as a single tradition. In the list which follows the reference to Diodorus is given along with any other pertinent citations. This list is terminated in 308/7 to include the last of Diodorus' list with the links into the Hellenistic Period, below.

Ol.	Year	Archon	Diodorus	
75,1	480/79	Kalliades	11,1	*MP* A 51
75,2	479/8	Xanthippos	11,27	*MP* A 52
75,3	478/7	Timosthenes	11,38	*MP* A 53
75,4	477/6	Adeimantos	11,41	*MP* A 54
76,1	476/5	Phaidon	11,48	
76,2	475/4	Dromokleides	11,50	
76,3	474/3	Akestorides	11,51	
76,4	473/2	Menon	11,52	
77,1	472/1	Chares	11,53	*MP* A 55
77,2	471/0	Praxiergos	11,54	
77,3	470/69	Demotion	11,60	
77,4	469/8	Apsephion	11,63 (Aphepsion)	*MP* A 56; DL 2, 44 (Apoll. *F. Gr. Hist.* 244 F 34) (Aphepsion)
78,1	468/7	Theagenides	11,65	*MP* A 57
78,2	467/6	Lysistratos	11,66	
78,3	466/5	Lysanias	11,67	
78,4	465/4	Lysitheos	11,69	
79,1	464/3	Archedemides	11,70	
79,2	463/2	Tlepolemos	11,71	
79,3	462/1	Konon	11,74	

79,4	461/0	Euthippos	11,75 (Euippos)	*MP* A 58
80,1	460/59	Phrasikleides	11,77	
80,2	459/8	Philokles	11,78	
80,3	458/7	Habron	11,79 (Bion)	*P. Oxy.* 2438.7ff.; Thom. Mag. *Vit. Pind.* (Schol. Vet. ed. Drachmann I, p. 7) – Abion
80,4	457/6	Mnesitheides	11,81	
81,1	456/5	Kallias	11,84	*MP* A 59
81,2	455/4	Sosistratos	11,85	
81,3	454/3	Ariston	11,86	
81,4	453/2	Lysikrates	11,88	
82,1	452/1	Chairephanes		*P. Oxy.* 2438.14 (7 years from Habron)
82,2	451/0	Antidotos	11,91	
82,3	450/49	Euthydemos	12,3	
82,4	449/8	Pedieus	12,4	
83,1	448/7	Philiskos	12,5	
83,2	447/6	Timarchides	12,6	
83,3	446/5	Kallimachos	12,7	
83,4	445/4	Lysimachides	12,22	
84,1	444/3	Praxiteles	12,23	
84,2	443/2	Lysanias	12,24	
84,3	442/1	Diphilos	12,26	*MP* A 60
84,4	441/0	Timokles	12,27	
85,1	440/39	Morychides	12,29	
85,2	439/8	Glaukinos	12,30 (Glaukidos)	
85,3	438/7	Theodoros	12,31	
85,4	437/6	Euthymenes	12,32	
86,1	436/5	Lysimachos	12,33 (Nausimachos)	
86,2	435/4	Antiochides	12,34 (Antilochides)	
86,3	434/3	Krates	12,35 (Chares)	
86,4	433/2	Apseudes	12,36	
87,1	432/1	Pythodoros	12,37	
87,2	431/0	Euthynos	12,38 (Euthydemos)	
87,3	430/29	Apollodoros	12,43	
87,4	429/8	Epameinon	12,46	
88,1	428/7	Diotimos	12,49	
88,2	427/6	Eukles	12,53 (Eukleides)	
88,3	426/5	Euthynos	12,58 (Euthydemos)	
88,4	425/4	Stratokles	12,60	
89,1	424/3	Isarchos	12,65	
89,2	423/2	Amynias	12,72 (Ameinias)	
89,3	422/1	Alkaios	12,73	
89,4	421/0	Aristion	12,75	
90,1	420/19	Astyphilos	12,77	*MP* A 61
90,2	419/8	Archias	12,78	
90,3	418/7	Antiphon	12,80	
90,4	417/6	Euphemos	12,81	
91,1	416/5	Arimnestos	12,82	

91,2	415/4	Charias	13,2 (Chabrias)	
91,3	414/3	Tisandros	13,7	
91,4	413/2	Kleokritos	13,9	
92,1	412/1	Kallias	13,34	
92,2	411/0	Mnasilochos & Theopompos	13,38	*Ath. Pol.* 33,1: Mnasilochos during tenure of 400, then Theopompos
92,3	410/09	Glaukippos	13,43	
92,4	409/8	Diokles	13,54	
93,1	408/7	Euktemon	13,68	*MP* A 62
93,2	407/6	Antigenes	13,76	*MP* A 63
93,3	406/5	Kallias	13,80	*MP* A 64, *Ath. Pol.* 34, 1 emended
93,4	405/4	Alexias	13,104	
94,1	404/3	Anarchia	14,3	
		Pythodoros		*Ath. Pol.* 41.1
94,2	403/2	Eukleides	14,12	
94,3	402/1	Mikon	14,17 (Mikion)	*MP* A 65
94,4	401/0	Xenainetos	14,19 (Exainetos)	
95,1	400/399	Laches	14,35	*MP* A 66
95,2	399/8	Aristokrates	14,38	*MP* A 67
95,3	398/7	Euthykles	14,44 (Ithykles)	
95,4	397/6	Souniades	14,47 (Lysiades)	
96,1	396/5	Phormion	14,54	
96,2	395/4	Diophantos	14,82	
96,3	394/3	Euboulides	14,85	
96,4	393/2	Demostratos	14,90	
97,1	392/1	Philokles	14,94	
97,2	391/0	Nikoteles	14,97	
97,3	390/89	Demostratos	14,99	
97,4	389/8	Antipatros	14,103	
98,1	388/7	Pyrgion	14,107	
98,2	387/6	Theodotos	14,110	
98,3	386/5	Mystichides	15,2	
98,4	385/4	Dexitheos	15,8	
99,1	384/3	Dieitrephes	15,14 (Diotrephes)	DH *ad Amm.* 5 (Apoll. *F. Gr. Hist.* 244 F 38)
99,2	383/2	Phanostratos	15,15	
99,3	382/1	Euandros	15,20	
99,4	381/0	Demophilos	15,22	
100,1	380/79	Pytheas	15,23	*MP* A 69
100,2	379/8	Nikon	15,24	
100,3	378/7	Nausinikos	15,25	
100,4	377/6	Kalleas	15,28 (Kallias)	
101,1	376/5	Charisandros	15,36	
101,2	375/4	Hippodamos	15,38	
101,3	374/3	Sokratides	15,41	
101,4	373/2	Asteios	15,48	*MP* A 71
102,1	372/1	Alkisthenes	15,50	
102,2	371/0	Phrasikleides	15,51	*MP* A 72
102,3	370/69	Dysniketos	15,57	
102,4	369/8	Lysistratos	15,61	
103,1	368/7	Nausigenes	15,71	*MP* A 74

103,2	367/6	Polyzelos	15,75		
103,3	366/5	Kephisodoros	15,76	*MP* A 75	
103,4	365/4	Chion	15,77		
104,1	364/3	Timokrates	15,78		
104,2	363/2	Charikleides	15,82		
104,3	362/1	Molon	15,90		
104,4	361/0	Nikophemos	15,95		
105,1	360/59	Kallimedes	16,2		
105,2	359/8	Eucharistos	16,4		
105,3	358/7	Kephisodotos	16,6		
105,4	357/6	Agathokles	16,7	*MP* A 78	
106,1	356/5	Elpines	16,15		
106,2	355/4	Kallistratos	16,23		
106,3	354/3	Diotimos	16,28		
106,4	353/2	Thoudemos	16,32		
107,1	352/1	Aristodemos	16,37	*P. Oxy.* 12 = *F. Gr. Hist.* 255 (2)	
107,2	351/0	Theelos	16,40	(2)	
107,3	350/59	Apollodoros	16,46	[(2)]	
107,4	349/8	Kallimachos	16,52	(2)	
108,1	348/7	Theophilos	16,53	(3)	Diog. Laert. V, 9 (Apollodorus, *F. Gr. Hist.* 244 F 38)
108,2	347/6	Themistokles	16,56	(3)	
108,3	346/5	Archias	16,59	(3)	
108,4	345/4	Euboulos	16,66	(3)	*ibid.*
109,1	344/3	Lykiskos	16,69	[(4)]	
109,2	343/2	Pythodotos	16,70	(4)	*ibid.*
109,3	342/1	Sosigenes	16,72	(4)	Diog. Laert. X, 15 (Apollodorus, *F. Gr. Hist.* 244 F 42
109,4	341/0	Nikomachos	16,74	(4)	
110,1	340/39	Theophrastos	16,77	(5)	
110,2	339/8	Lysimachides	16,82	(5)	
110,3	338/7	Charondes	16,84	(5)	
110,4	337/6	Phrynichos	16,89	(5)	
111,1	336/5	Pythodelos	16,91 (Pythodoros)	(6)	*MP* B 1
111,2	335/4	Euainetos	17,2	(6)	*MP* B 2; Diog. Laert. V, 10 (Apollodorus, *F. Gr. Hist.* 244 F 38) Dion. Hal. *ad. Amm.* 5.
111,3	334/3	Ktesikles	17,7	(6)	*MP* B 3
111,4	333/2	Nikokrates	17,29	(6)	*MP* B 4
112,1	332/1	Niketes	17,40 (Nikeratos)	(7)	*MP* B 5
112,2	331/0	Aristophanes	17,49	(7)	
112,3	330/29	Aristophon	17,62	(7)	*MP* B 6
112,4	329/8	Kephisophon	17,74	(7)	
113,1	328/7	Euthykritos	17,82	(8)	*MP* B 7
113,2	327/6	Hegemon		(8)	
113,3	326/5	Chremes	17,87	(8)	
113,4	325/4	Antikles	17,110	<(8)>	
114,1	324/3	Hegesias	17,113 (Agesias)	(9)	*MP* B 8
114,2	323/2	Kephisodoros	18,2	(9: Kephisophon)	*MP* B 9
114,3	322/1	Philokles	18,26	(9)	*MP* B 10; Diog. Laert. V, 10 (Apollodorus, *F. Gr. Hist.* 244 F38)
114,4	321/0	Archippos	18,58	(9)	*MP* B 11
115,1	320/19	Neaichmos		(10)	

115,2	319/8	Apollodoros		(10)	*MP* B 12
115,3	318/7	Archippos		(10)	
115,4	317/6	Demogenes		(10)	*MP* B 13
116,1	316/5	Demokleides	19,17	(11)	*MP* B 14
116,2	315/4	Praxiboulos	19,55	(11)	
116,3	314/3	Nikodoros	19,66	(11)	
116,4	313/2	Theophrastos	19,73	(11: Theodoros)	*MP* B 15
117,1	312/1	Polemon	19,77		*MP* B 16
117,2	311/0	Simonides	19,105		*MP* B 17
117,3	310/09	Hieromnemon	20,3		*MP* B 18
117,4	309/8	Demetrios of Phaleron	20,77		*MP* B 19
118,1	308/7	Kairimos	20,37 (Charinos)		*MP* B 20

After the End of Diodorus' Text

The last complete book of Diodorus is XX, giving the archon of 302/1 in chapter 106. From that year on, the reconstruction of the archon list depends heavily upon epigraphical evidence, with some assistance from scattered literary testimony. The principles for assigning archons to years depend in the final analysis upon Ferguson's "law," that the secretaries of the boule were rotated according to tribe[1] and that therefore the archons must be assigned to years according to the secretary cycle. Two phenomena prevent this law, which now seems generally accepted and is well attested, from establishing the archons in their years with certainty. First we do not know the secretaries for all the archons; of the known archons of the third and second centuries, at least one-quarter are known without their corresponding secretaries, and therefor must be placed without the assistance of the tribal cycles. Second, there were breaks in the cycles, and the assignment of secretaries (and archons) to years depends upon the accurate and agreed establishment of the breaks and the lengths of the undisturbed cycles between breaks. With these factors present, and considering also that all the archons of the third and second centuries are not yet known, successive studies of the archon list are marked by striking reassignments of archons. Since very few of the archons are placed in specific years by any evidence, the relocation of breaks in the secretary cycle brings great shifts in placement of secretaries and archons; 'unsecretaried' archons are shoved about with even greater freedom.

It is small wonder then that the history of the examination of the Hellenistic archon list has been one of unremitting controversy and change.[2] In the list which follows,

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[1] W.S. Ferguson, *Athenian Secretaries*, Cornell Studies in Classical Philology 7, 1898.

[2] The major studies, after Ferguson's *Athenian Archons*, Corn. Stud. X, 1899, are: W.B. Dinsmoor, *The Archons of Athens in the Hellenistic Age*, Cambridge, Mass., 1931; Dinsmoor, *The Athenian Archon List in The Light of Recent Discoveries*, New York, 1939; B.D. Meritt and W.K. Pritchett, *The Chronology of Hellenistic Athens*, Cambridge, Mass, 1940 (P.-M.). Besides these, there are a number of works which bear upon the questions of official cycles, relevant to the whole question of the archon list; by W.S. Ferguson, see "The Priests of Asklepios," *Univ. of Calif. Public. in Class. Philol.* I, 1907, pp. 131–173; *Hellenistic*

I have taken for the third and second centuries the list which Meritt offers in his most recent work.[1] I have tried, however, to give some indication here of my own judgement on the security of each assignment, and have distributed the list into three columns. In the first column appear those archons who are assigned to specific years by some ancient source, in the second column appear those archons whose placement depends solely upon the reconstruction of the secretary cycle, and in the third column appear the names of those archons whose placement cannot be effected by either of these means.[2] While it is impossible to gauge any probabilities of accuracy of the various categories of the list, I may express my subjective reaction: I should be surprised to find any attributions of the first category to be wrong; I should not be surprised to find attributions according to the secretary cycle to be wrong; I have only limited confidence in the correctness of individual assignments of the third category, and I should be astounded to find all (or even a great majority) to be correct.

Athens, London, 1911, *Treasurers of Athena*, Cambridge, Mass., 1932; *Athenian Tribal Cycles in the Hellenistic Age*, Cambridge, Mass., 1932; cf. also the works cited below, note 2, and besides, those cited above, under the section dealing with the Athenian calendar. For the first century, see notably S. Dow, "Archons of the Period After Sulla," *Hesp.* Suppl. 8, 1949, pp. 116–125, with citations there.

[1] His last complete table is in *The Athenian Year* (M. *Year*) Berkeley, Calif., 1961, pp. 231–238, but this is modified by Meritt's own revisions in *Hesp.* 33, 1964, for the years 155/4–145/4, and in *TAPA* 95, 1964, in part a rejoinder to Pritchett's discussion, *inter alia*, of the archon, list in *Ancient Athenian Calendars on Stone*, Univ. of Calif. Publ. in Class. Archaeol. 4, 4, 1963, M. offers other revisions of his 1961 list. Although one may acknowledge differences about items on Meritt's list, and though even he would admit it is not final, tribute ought be paid to the constant refinement which has steadily added to our knowledge.

[2] Here is the place perhaps to express certain doubts and reservations. The list of priests of Asklepios is not very useful for consolidation of the archon list. Very few of the priests can be connected epigraphically with specific archons, and, as the priest list is even less well established than the archon list, archons are best used to place priests, rather than vice-versa. In evaluating the evidence to formulate my three columns, I have deliberately excluded any evidence based on reconstruction, and I have avoided conclusions based on arguments connected with the Athenian calendar. Since placement of archons (with intercalary years) affects the calendar, and interpretations of calendar equations with concomitant bearing on intercalary years and archons tend towards circular discussions, it seems better to evaluate only that evidence which bears directly on the archon list.

I am aware that the work of Margaret Thompson, *The New Style Silver Coinage of Athens*, New York, 1961, with its evidence on intercalary years (pp. 608–613) will have significant bearing on the application of calendar data to the archon list.

On the dates afforded by Apollodorus, it is worth noting that while one may be comfortable in accepting statements that one archon followed another, as Antipatros-Arrhenides (261/0–260/59), one must acknowledge reservations where there is dispute about the meaning, as Pantiades in 205/4. Where long periods of time are indicated (24 years between Aristaichmos and Nichomachos, 10 and 19 years, Hagnotheos-Lykiskos-Polykleitos) the question of inclusive/exclusive reckoning becomes relevant (as it may too be for the testimony of Plutarch, that Pytharatos, 271/0, was in the tenth year after Gorgias, although this phraseology seems better and clearer than most of that attributed to Apollodorus). Meritt's blanket reservation in 1961 (*Year*, p. 225) "I do not regard the measurements of the intervals of time in the lives of the philosophers as having the same accuracy, in our sense of the word, as do the definitions of the limits in terms of Athenian archonships." would seem to be applicable, at least in terms of inclusive/exclusive reckoning, when the periods of time in a life are taken to fix the archonships attached to the periods.

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
118,2	307/6	DS 20, 45 *MP* B 21	Anaxikrates						
118,3	306/5	DS 20, 73 *MP* B 22	Koroibos						
118,4	305/4	DS 20, 81 (*MP* B 23)	Euxenippos						
119,1	304/3	DS 20, 91 *MP* B 24	Phereklcs						
119,2	303/2	DS 20, 102 *MP* B 25	Leostratos						
119,3	302/1	DS 20, 106 *MP* B 26	Nikokles						
				Dion. Hal. *Din.* 9					
119,4	301/0		Klearchos						
120,1	300/299		Hegemachos						
120,2	299/8		Euktemon						
120,3	298/7		Mnesidemos						
120,4	297/6		Antiphates						
121,1	296/5		Nikias						
121,2	295/4		Nikostratos						
121,3	294/3		Olympiodoros						
			IG II² 329 (Dins. 1,21)						
121,4	293/2		Olympiodoros						
122,1	292/1		Philippos						
					Hesp. 26, No. 10				
122,2	291/0				Charinos	Theotimos	Trikorynthos XI (Τ̣ρ̣[ι]κ̣ορύσ[ιος])		
				P.-M., p. 88–91					

122,3	290/89								Telokles
					IG II² 669				
122,4	289/8				Aristonymos	Kleigenes	Aithalidai		
123,1	288/7								
123,2	287/6								Xenophon
					IG II² 650				
123,3	286/5				Diokles	Xenophon	Halai	IV	
					IG II² 653				
123,4	285/4				Diotimos	Lysistratos	Paiania	V	
				IG II² 656					
124,1	284/3				Isaios				
				IG II² 657	*IG* II² 657				
124,2	283/2				Euthios	Nausimenes	Cholargos	VII	
				Hesp. 7, No. 18	*Hesp.* 7, No. 18				
124,3	282/1				Nikias	Theophilos	Acharnai	VIII	
					IG II² 660 B				
124,4	281/0				Ourios	Euxenos	Aixone	IX	
125,1	280/79		Gorgias						
125,2	279/8	Paus. X, 23,14	Anaxikrates						
125,3	278/7	Paus. X, 23,14	Demokles						
				Plut. *Mor.* 847 D					
125,4	277/6								Sosistratos
					SEG III 94				
126,1	276/5				Philokrates	Hegesippos	Melite	II	
					Hesp. 2, No. 5				
126,2	275/4				Olbios	Kydias	Euonymon	III	
126,3	274/3								Euboulos
					IG II² 674				
126,4	273/2				Glaukippos	Euthoinos	Myrrhinous	IV	
					Hesp. 26, No. 11				
127,1	272/1				Lysitheides	Simonides	Sounion	VI	
					Hesp. 23, No. 182 (= M. *Year*, p. 151)				
127,2	271/0	DL X,15 = *F. Gr. Hist.* 244,42 (Apollodorus)	Pytharatos			Isegoros	Kephale	VII	
127,3	270/69								Philippides

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
127,4	269/8								Philinos
					IG II^2 772				
128,1	268/7				Diogeiton	Theodotos	Keiriadai	X	
					IG II^2 661				
128,2	267/6			IG II^2 665	Menekles	Theodoros	Trikorynthos	XI	
					IG II^2 665				
128,3	266/5				Nikias Otryneus	Isokrates	Alopeke		
128,4	265/4								Peithidemos
129,1	264/3	*MP* line 3	Diognetos						
129,2	263/2								Polystratos
					IG II^2 770				
129,3	262/1				Kleomachos	Aphthonetos	Kettos	VI	
129,4	261/0			Philodem. *Ind. Sto.* III = Apollodorus (*F. Gr. Hist.* 244, F 44)					Antipatros
130,1	260/59								Arrheneides
130,2	259/8								Antiphon
130,3	258/7								Thymochares
130,4	257/6								Lykeas
131,1	256/5								Euboulos
131,2	255/4								Alkibiades
131,3	254/3								Philostratos
131,4	253/2								. . . bios
					IG II^2 777				
132,1	252/1				Kallimedes	Kallias	Plotheia	IV	
					IG II^2 768 + 802				
132,2	251/0				Antimachos	Chairigenes	Myrrhinous	V	
					IG II^2 778 + *Hesp.*, 7, No. 23				
132,3	250/49			*Hesp.* 7, No. 24	Thersilochos	Diodotos	Phrearrhoi	VI	
					SEG III 92				
132,4	249/8				Polyeuktos	Chairephon	Kephale	VII	

133,1	248/7	*IG* II^2 683 *SEG* II 9	Hieron	*IG* II^2 683	Phainylos	Oe	VIII	
133,2	247/6		Diomedon	*IG* II^2 791	Phoryskides	Anagyrous	III	
133,3	246/5							Philoneos
133,4	245/4							Theophemos
134,1	244/3	*SEG* II 9	Kydenor	*Hesp.* 17, No. 3 (M. *Year*, p. 147)	Polyktemon	Eupyridai	VI	
134,2	243/2		Eurykleides					
134,3	242/1							Phanomachos
134,4	241/0							Lysiades
135,1	240/39		Athenodoros	*IG* II^2 784	Arketos	Hamaxanteia	X	
135,2	239/8							Lysias
135,3	238/7							Phanostratos
135,4	237/6							Kimon
136,1	236/5	IG II^2 788	Ekphantos	*IG* II^2 787	.......]os	Hippotomadai	II	
136,2	235/4		Lysanias	*IG* II^2 790	Eumelos	Euonymon	III	
136,3	234/3							Pheidostratos
136,4	233/2							
137,1	232/1							
137,2	231/0							Jason
137,3	230/29							
137,4	229/8	*IG* II^2 1706 (cf. Dow, *Hesp.* 2, 1933)	Heliodoros	*IG* II^2 832	Charias	Athmonon	IX	
138,1	228/7		Leochares	*Pryt.* No. 29	Theokrisios	Oion	X	
138,2	227/6		Theophilos	*IG* II^2 837 (= M. *Year* p. 143)	Philippos	Aphidna	XI	
138,3	226/5		Ergochares	*IG* II^2 838	Ziolos	Alopeke	XII	
138,4	225/4		Niketes					

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
				IG II² 1706 (cf. Dow, *Hesp.* 2, 1933)					
139,1	224/3				Antiphilos				
139,2	223/2								
					IG II² 848 (= M. *Year* p. 173)				
139,3	222/1				Archelaos	Moschos	Ankyle	IV	
					IG II² 839 (= M. *Year.* p. 174)				
139,4	221/0	*Syll.*³ 557	Thrasyphon			.....	Paiania	V	
140,1	220/19				Menekrates				
					Hesp. 11, No. 59 (= M. *Year* p. 169				
140,2	219/8				Chairephon	......	Kydantidai	VII	
140,3	218/7				Kalli [---]				
140,4	217/6								
					IG II² 794				
141,1	216/5				Hagnias	Potamon			
					IG II² 846				
141,2	215/4				Diokles	Aristophanes	Keiriadai	XI	
141,3	214/3				Euphiletos				
				IG II² 1314					
141,4	213/2				Herakleitos				
142,1	212/1								Euandros
142,2	211/0								Aischron
142,3	210/09								Sostratos
142,4	209/8								
143,1	208/7								Ankylos
143,2	207/6								
					IG II² 849				
143,3	206/5			Philodem. *In Acad.* 27 (= Apollodorus, *F. Gr. Hist.* 244, 47)	Kallistratos	Hagnonides			
						For discussion of the meaning of the Apollodorus frg., cf. Beloch, *Gr. Gesch.* IV, 2, p. 558			
143,4	205/4								Pantiades
					IG II² 973 (= M. *Year.* p. 179)				
144,1	204/3				Apollodoros		Oc	IX	

			Pryt. 40				
144,2	203/2		Proxenides	Euboulos	Aixone	X	
144,3	202/1						Diodotos
144,4	201/0						Isokrates
145,1	200/199	*IG* II^2 1323					Nikophon
145,2	199/8						. . . i]ppos
145,3	198/7						Dionysios
145,4	197/6						Dionysios
			IG II^2 785				
146,1	196/5		Charikles	Aischrion	Rhamnous	X	
146,2	195/4						
146,3	194/3						
			M. *Year* p. 195				
146,4	193/2		Hippias	Theodosios	Lamptrai	I	
147,1	192/1						
147,2	191/0						
147,3	190/89						Demetrios
			Hesp. 26, No. 17				
147,4	189/8		Euthykritos	Kephalos	Kydantidai	V	
			IG II^2 890				
148,1	188/7	*IG* II^2 2323	Symmachos	Archikles	Thorikos	VI	
148,2	187/6		Theoxenos				
			IG II^2 896				
148,3	186/5		Zopyros	Megaristos	Aixone	VIII	
			IG II^2 897				
148,4	185/4		Eupolemos	Stratonikos	Hamaxanteia	IX	
149,1	184/3						
149,2	183/2	IG II^2 2323	Hermogenes				
			IG II^2 902				
149,3	182/1		Timesianax	. . .	Probalinthos	XII	
			IG II^2 864 + P.-M. p. 112				
149,4	181/0	P.-M. pp. 114-5	Phanarchides	. . .	Lamptrai	I	
			IG II^2 916 + P.-M. pp. 114-5				
150,1	180/79		Diodotos	Prokles	. . .		
			Hesp. 34, No. 1				
150,2	179/8		Menedemos	. . .	Angyle	III	

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
				Pryt. 64	*Pryt.* 64				
150,3	178/7				Philon	Philistion	Potamos	IV	
					Hesp. 16, No. 94				
150,4	177/6				[---i]ppos	. ! .	Oinoe	V	
					P.-M. p. 120				
151,1	176/5			IG II² 1328	Hippakos	. . .	Iphistiadai	VI	
					IG II² 905				
151,2	175/4				Sonikos	Pausanias	Perithoidai	VII	
					Hesp. 26, No. 21				
151,3	174/3				Alexandros	Autokrates	Pithos	VIII	
151,4	173/2								Alexis
152,1	172/1			*Hesp.* 3, No. 17	Sosigenes				
					Hesp. 3, No, 17				
152,2	171/0				Antigenes	Sosandros	Alopeke	XI	
152,3	170/69								Aphrodisios
					Pryt. 71				
152,4	169/8			*IG* II² 2323	Eunikos	Hieronymos	Kephisia	I	
					IG II² 945				
153,1	168/7				Xenokles	Sthenedemos	Teithras	II	
153,2	167/6								Nikosthenes
					IG II² 946–8				
153,3	166/5				Achaios	Herakleon	Eupyridai	IV	
					IG II² 949				
153,4	165/4				Pelops	Dionysikles	Hekale	V	
					Hesp. 26, No. 22				
154,1	164/3				Euergetes	Dionysodoros	Kephale	VI	
					Hesp. 2, No. 20				
154,2	163/2			*IG* II² 2323	Erastos	Demetrios	Epikephisios	VII	
154,3	162/1				Poseidonios				
					IG II² 952				
154,4	161/0				Aristolas	. . .	Eleusis	IX	

155,1	160/59	*IG* II² 953	Tychandros	Sisigenes	Marathon	X	
155,2	159/8						Aristaichmos Philodem., *Ac. Ind.* 33, gives 24 years between Aristaichmos and Nikomachos (below, 134/3)
155,3	158/7	cf. M. *Year* p. 184	Pyrrhos				
155,4	157/6	*IG* II² 2323	Anthesterios				
156,1	156/5		Kallistratos				
156,2	155/4	*Pryt.* 84	Mnesitheos	Philiskos	Paiania	III	
156,3	154/3						Aristophantos
156,4	153/2	*Pyrt.* 65	Speusippos	. . .	Phlya	V	
157,1	152/1						Lysiades Epainetos ?
157,2	151/0						Epainetos Zaleukos ?
157,3	150/49				Alternate schemes for these years, Meritt, *Hesp.* 33, 1964		Zaleukos Mikion ?
157,4	149/8						Phaidrias
158,1	148/7						Mikion Lysiades ?
158,2	147/6	*Inscr. Delos* 1505	Archon				
158,3	146/5	*Inscr. Delos*, 1504	Epikrates	Xen---	Sypalettos	VIII (XII–M)	
158,4	145/4	*IG* II² 967	Metrophanes	Epigenes	Lamptrai	I	
159,1	144/3						Andreas
159,2	143/2	Philodem. *Acad. Ind.*					Theaitetos
159,3	142/1						Aristophon
159,4	141/0						Pleistainos

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
		Hagnotheos-Lykiskos, 10 years, according to Apollodorus, *F. Gr. Hist.* 244, 56 (inclusive/ exclusive? reckoning)			*IG* II² 969				
160,1	140/39				Hagnotheos	Menekrates	Thorikos	VI	
					M. *Year* p. 237				
					Hesp. 26, No. 2		*Hesp.* 29, No. 154		
160,2	139/8				Diokles		Thria	VII	
160,3	138/7				Timarchos				
				IG II² 974	*IG* II² 974				
160,4	137/6				Herakleitos	Dionysios	Anakaia	IX	
161,1	136/5				Timarchides				
				Hesp. 9, No. 26	*Hesp.* 9, No. 26				
161,2	135/4				Dionysios	Theolytos	Amphitrope	XI	
161,3	134/3								Nikomachos
161,4	133/2								Xenon
162,1	132/1			*IG* II² 1227					Ergokles
162,2	131/0								Epikles
162,3	130/29						M. *Year* p. 237		Demostratos
162,4	129/8		Lykiskos				Berenikidai	V	
					Hesp. 4, No. 37				
163,1	128/7		Dionysios				Kephale	VI	
					Hesp. 4, No. 37				
163,2	127/6		Theodorides			Sosikrates	Thria	VII	
163,3	126/5		Diotimos						
				IG II² 1713					
		Phlegon,			*IG* II² 1003				
163,4	125/4	*F. Gr. Hist.* 257, 36 (x)	Jason			Athenodoros	Eleusis	IX	
164,1	124/3		Nikias + Isegenes						
164,2	123/2		Demetrios						
				IG II² 1006	*IG* II² 1004				
164,3	122/1		Nikodemos			Epigenes	Oinoe	XII	
164,4	121/0								Phocion
165,1	120/19								Eumachos

165,2	119/8	*IG* II^2 1008	Hipparchos		M. *Year* p. 237 Paiania	III	
165,3	118/7		Lenaios	*IG* II^2 1008 Isidoros	Skambonidai	IV	
165,4	117/6	*IG* II^2 1009	Menoites				
166,1	116/5		Sarapion	*IG* II^2 1009 Sophokles	Iphistiasai	VI	
166,2	115/4						Nausias
166,3	114/3						--]ratou
166,4	113/2	*IG* II^2 1012	Paramonos				
167,1	112/1		Dionysios	*IG* II^2 1012 Lamios	Rhamnous	X	
167,2	111/0		Sosikrates	*IG* II^2 1135 . . .	Krioa	XI	
167,3	110/9	Lykiskos (129/8) – Polykleitos 19 years, according to Apollodorus, *F. Gr. Hist.* 244, 56 (inclusive? exclusive reckoning) *IG* II^2 1014	Polykleitos				
167,4	109/8		Jason	*IG* II^2 1014 Epiphanes	Lamptrai	I	
168,1	108/7		Demochares	*IG* II^2 1036 . . .	Ankyle	II	
168,2	107/6	*IG* II^2 1011	Aristarchos	*IG* II^2 1011 Telestes	Paiania	III	
168,3	106/5		Agathokles	*IG* II^2 1011 Eukles	Aithalidai	IV	
168,4	105/4						
169,1	104/3		Herakleides	*Hesp.* 26, No. 1 Thrasyboulos	Hermos	VI	
169,2	103/2	*IG* II^2 2336	Theokles	*IG* II^2 1034 --]thenes	Kothokidai	VII	
169,3	102/1		Echekrates				
169,4	101/0	NB-Theokles restored on basis of *Inscr. Delos* 1927 – epimeletes of his yr. dated to 103/2. Argeios restored: epimeletes Medeios of his yr. (line 185) synchron. with coss. Rom. 97 in *Inscr. Delos* 1757; cf. Dins. 1939, p. 203)	Medeios	*IG* II^2 1028 Philion	Eleusis	IX	
170,1	100/99		Theodosios				
170,2	99/8		Prokles				
170,3	98/7		Argeios				
170,4	97/6		Herakleitos				

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
171,1	96/5								--kratou
171,2	95/4								Theodòtos
171,3	94/3								Kallias
171,4	93/2								Kriton
172,1	92/1								Menedemos
172,2	91/0		Medeios						
172,3	90/89		Medeios	*IG* II^2 1713					
172,4	89/8		Medeios						

The Roman Period

The state of evidence for the list becomes progressively worse as we proceed into the Roman period, and although the list of the Roman period was never, so far as we know, used for historical chronology in antiquity, uncertainties in the list affect seriously the dating of inscriptions of the Roman period. The evidence itself is largely epigraphical. Graindor, in the most extensive modern treatment of the Roman list,[1] concluded that the secretary cycles were not applicable, and dated archons without that tool. With later finds and publication of inscriptions, Notopoulos[2] was able to propose a list of archons for whom secretaries were attested based on an arrangement which reflected a continuance of the secretary cycles. There are fewer secretaries attested in the Roman period[3] and this limits the applicability of the cyclical principle. In the following list, I have used the same arrangement as that for the Hellenistic period, indicating those archons dated by an ancient source, by the secretary cycle, and by neither of these.[4]

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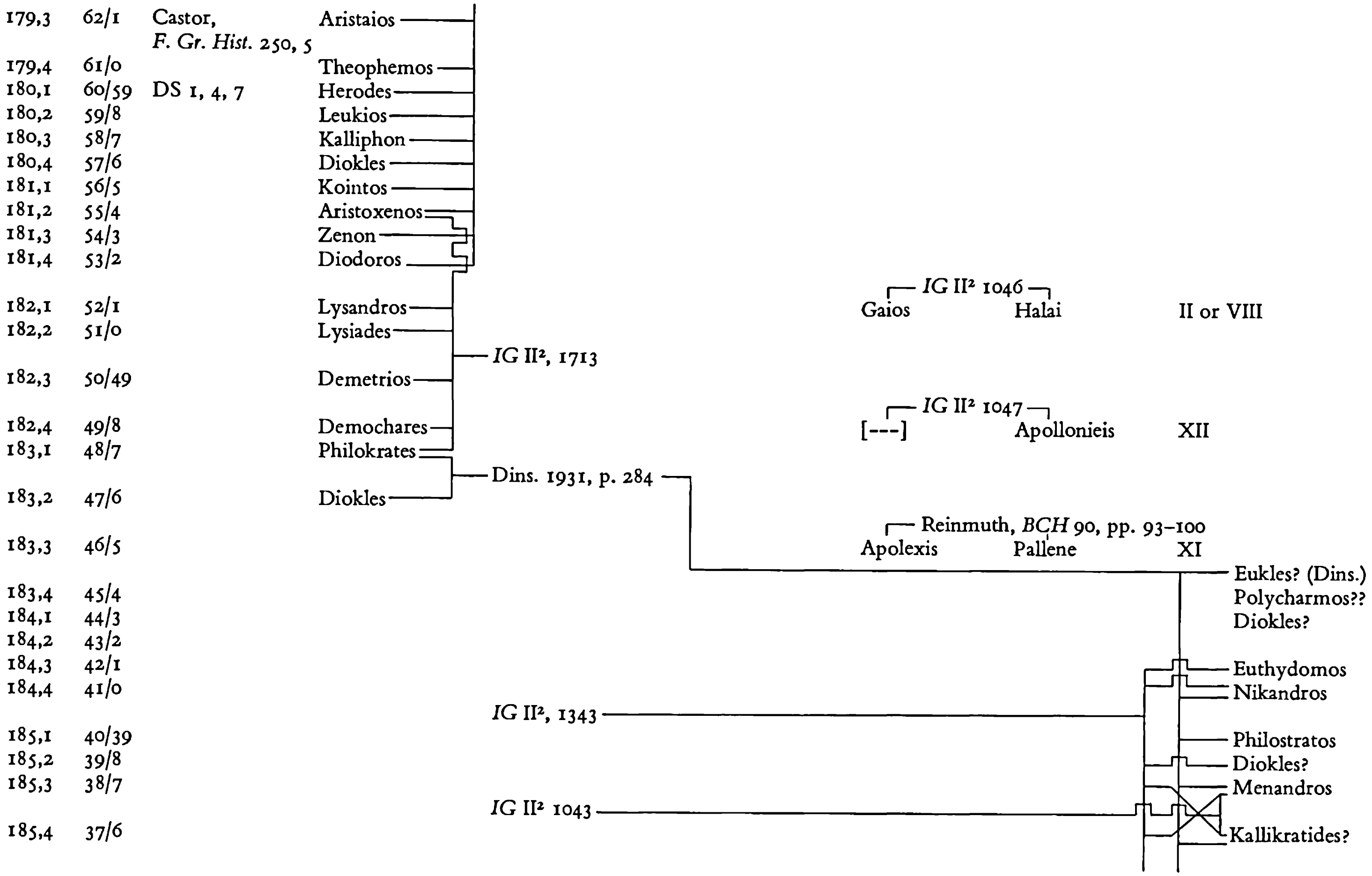
[1] P. Graindor, *Chronologie des archontes athéniens sous l'Empire*, 1920 (Acad. Royale des Sciences, des Lettres, et des Beaux-arts de Belgique, Brussels, Classe des Lettres et des Sciences morales et politique, Memoires, Ser. 2, vol. 8), pp. 13, 14, note 1.

[2] J. Notopoulos, "Ferguson's Law in Athens under the Empire," *Am. Journ. Philol.* 64, 1943, pp. 44–45; "Studies in the Chronology of Athens," *Hesp.* 18, 1949, pp. 1–57.

[3] And fewer from decrees. Cf. Notopoulos, *Hesp.* 18, p. 10.

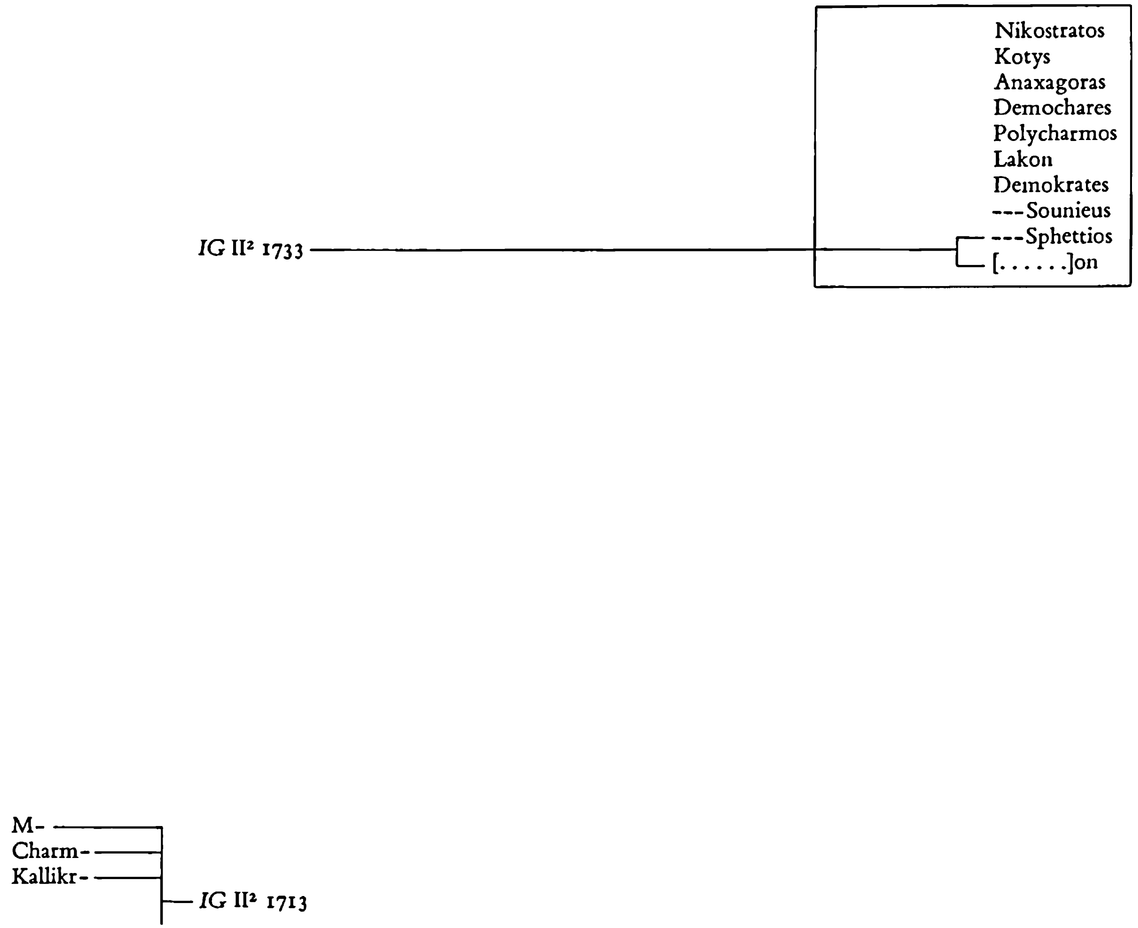
[4] To formulate the list after Sulla, I have accepted the dates of Dow, *Hesp.* Suppl. 8, 1949, p. 117, and, for the period 53/2 to Augustus, I have used the dates of Dinsmoor, 1931, pp. 280ff., incorporating the data of Notopoulos, 1949. For the empire I have followed the list of J.H. Oliver, *Hesp.* 11, 1942, pp. 82–89 (a list based on Kirchner, *IG* II/III^2 pars 2 fasc. 2, 1931, pp. 789–796) but accepting the suggestions of Notopoulos, 1949, and the evidence of later publication.

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
173,1	88/7	Ath. 5, 213c (no date)	Ἀναρχία						
173,2	87/6		Philanthes	*IG* II^2 1713					
173,3	86/5		Hierophantes						
173,4	85/4		Pythokritos						
174,1	84/3		Niketes	*Hesp.* Suppl. 8, p. 117; if Dow's reconstruction is correct, lower frag, securely dated, fixes archons in upper frag. Reconstruction of whole stone generally accepted, and confirmed, *inter alia*, by Jason, 125/4, and Herodes, 60/59.					
174,2	83/2		Pammenes						
174,3	82/1		Demetrios						
174,4	81/0		Ar [-------]						
175,1	80/79								Apollodoros
175,2	79/8			*IG* II^2 1039					[-------]os
175,3	78/7			*IG* II^2 1338					Aischraios
175,4	77/6			*IG* II^2 3489					Seleukos
176,1	76/5								Herakleodoros
176,2	75/4								Aischines
176,3	74/3								
176,4	73/2								
177,1	72/1								
177,2	71/0								
177,3	70/69								D[------]
177,4	69/8								Medeios
178,1	68/7								Theoxenos
178,2	67/6								Zenion
178,3	66/5								
178,4	65/4								
179,1	64/3			*Hesp.* 17, No. 14	Oinophilos	Taranteinos	Aigilia	V	
179,2	63/2								


179,3 62/1 Castor, F. Gr. Hist. 250, 5 Aristaios
179,4 61/0 Theophemos
180,1 60/59 DS 1, 4, 7 Herodes
180,2 59/8 Leukios
180,3 58/7 Kalliphon
180,4 57/6 Diokles
181,1 56/5 Kointos
181,2 55/4 Aristoxenos
181,3 54/3 Zenon
181,4 53/2 Diodoros
182,1 52/1 Lysandros
182,2 51/0 Lysiades
IG II², 1713
182,3 50/49 Demetrios
182,4 49/8 Demochares
183,1 48/7 Philokrates
Dins. 1931, p. 284
183,2 47/6 Diokles
183,3 46/5
183,4 45/4
184,1 44/3
184,2 43/2
184,3 42/1
184,4 41/0
185,1 40/39
185,2 39/8
185,3 38/7
185,4 37/6
IG II² 1046
Gaios
Halai
II or VIII
IG II² 1047
[---]
Apollonieis
XII
Reinmuth, BCH 90, pp. 93–100
Apolexis
Pallene
XI
Eukles? (Dins.)
Polycharmos??
Diokles?
Euthydomos
Nikandros
IG II², 1343
Philostratos
Diokles?
Menandros
IG II² 1043
Kallikratides?

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
186,1	36/5								Theopithes?
186,2	35/4								
186,3	34/3								Apollogenes?
186,4	33/2								Kleidamos?
187,1	32/1								
187,2	31/0								
187,3	30/29								Architimos
187,4	29/8								
									Epikrates
188,1	28/7								Menneas
									Areios
188,2	27/6								Polykleitos
									. . komedes
188,3	26/5								Diotimos
188,4	25/4								
189,1	24/3								
189,2	23/2								
189,3	22/1								
						Eleusiniaka I, 1932, p. 225			
189,4	21/0					Metrophanes	Athmonon	XII	Apolexis
190,1	20/19								Demeas
190,2	19/8								
190,3	18/7								
190,4	17/6		Ai--						
191,1	16/5		Pythagoras						
191,2	15/4		Antiochos						
				IG II^2 1713					
191,3	14/3		Polyainos						
191,4	13/2		Zenon						
192,1	12/1		Leonidas						
192,2	11/0		Theophilos						
192,3	10/09								Nikias
192,4	9/8								Xenon
193,1	8/7								Apolexis ex Oiou

193,2	7/6
193,3	6/5
193,4	5/4
194,1	4/3
194,2	3/2
194,3	2/1
194,4	1/1
195,1	1/2
195,2	2/3
195,3	3/4
195,4	4/5
196,1	5/6
196,2	6/7
196,3	7/8
196,4	8/9
197,1	9/10
197,2	10/11
197,3	11/2
197,4	12/3
198,1	13/4
198,2	14/5
198,3	15/6
198,4	16/7
199,1	17/8
199,2	18/9
199,3	19/20
199,4	20/1
200,1	21/2
200,2	22/3
200,3	23/4
200,4	24/5
201,1	25/6


Nikostratos
Kotys
Anaxagoras
Demochares
Polycharmos
Lakon
Demokrates
---Sounieus
---Sphettios
[......]on
IG II² 1733
M-
Charm-
Kallikr-
IG II² 1713

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe Archon
				IG II^2 1713				
201,2	26/7		Pamphilos					
201,3	27/8		Themistokles					
201,4	28/9		Oinophilos					
202,1	29/30		Boethos					
202,2	30/1		[. . . . .]tros					
202,3	31/2							
202,4	32/3							
203,1	33/4							
203,2	34/5							
203,3	35/6							
203,4	36/7							Basileus Rhoimetalkes Ne(oteros)
204,1	37/8							
								Arist[--
204,2	38/9							Polykritos
204,3	39/40							Zen[on?]
								Areios
204,4	40/1							---]ouios Leo
205,1	41/2							---]ouios Leo or
205,2	42/3							
205,3	43/4							
205,4	44/5							
206,1	45/6	Phlegon *F. Gr. Hist.* 257, 36 (VI)	Antipatros					
206,2	46/7							
206,3	47/8							Phi-
206,4	48/9							He-
207,1	49/50	Phlegon	Deinophilos					Herodes
		F. Gr. Hist. 257,						. . . .[inos
		36 (XXII)						Neiketes
207,2	50/1							Ti. Kh. Chrysippos
207,3	51/2							Metrodoros

207,4	52/3			Demosthenes Mithridates Kallikratides Lysiades Diokles
208,1	53/4	Phlegon *F. Gr. Hist.* 257, 36 (VII)	Dionysodoros	
208,2	54/5			
208,3	55/6			
208,4	56/7	Phlegon *F. Gr. Hist.* 257, 36 (XXVII)	Konon	
209,1	57/8			
209,2	58/9			
209,3	59/60			
209,4	60/1			
210,1	61/2	Phlegon, *F. Gr. Hist.* 257 36 (XX)	Thrasyllos	
210,2	62/3			
210,3	63/4			
210,4	64/5	Tac. *Ann.* 15, 45	G. Carrinus Gaius Filius Secundos	
211,1	65/6	Phlegon, *F. Gr. Hist.* 257, 36 (XXIII)	Demostratos	
211,2	66/7			
211,3	67/8			
211,4	68/9			
212,1	69/70			
212,2	70/1			
212,3	71/2			
212,4	72/3			
213,1	73/4			
213,2	74/5			
213,3	75/6			G. Ioulios Antiochos Epiphanes Philopappos Basileus
213,4	76/7			
214,1	77/8			
214,2	78/9			

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe Archon
214,3	79/80							ca 80 Loukios
214,4	80/1							
215,1	81/2							
215,2	82/3							
215,3	83/4	Phlegon *F. Gr. Hist.* 257, 36 (XXIV)	᾿Αναρχία					
215,4	84/5							
								Domitian
216,1	85/6			*FD* III 2 66				Trebellios Rouphos
216,2	86/7							᾿Αναρχία
216,3	87/8							Tib. Kl. Hierophantes Kallikratidos
216,4	88/9							Aiolion
217,1	89/90							Louk. Phlaouios Phlammas
217,2	90/1							Titos Phlaouios Leosthenes
217,3	91/2							--Oethen
217,4	92/3							[---]oteimos
								Dionysodoros
218,1	93/4							
218,2	94/5							
218,3	95/6				*IG* II² 1759 Philopappos kai Lailianos	Boulon	Phyle	VII
218,4	96/7							
219,1	97/8							
219,2	98/9							
219,3	99/100							
219,4	100/1							

220,1	101/2							Zopyros Ann[Phoulbios Deidios Diokles
220,2	102/3							
220,3	103/4							
220,4	104/5							
221,1	105/6							
221,2	106/7							
221,3	107/8							
221,4	108/9							
222,1	109/10							
222,2	110/1							
222,3	111/2							
222,4	112/3	Phlegon, *F. Gr. Hist.* 257, 36 (XXV)	Hadrian					
223,1	113/4				Oktaios Theon			
223,2	114/5				Oktaios Proklos			
223,3	115/6							Pantainos
223,4	116/7	Phlegon, *F. Gr. Hist.* 257, 36 (IX)	Phlaouios Makreinos					
					IG II² 1072			
224,1	117/8				T. Koponios	Neikias	Phlya	V
					Maximos			
224,2	118/9				L. Ouiboullios Hipparchos			
				Inscr. Delos 2535				
224,3	119/20				Phlaouios Stratolaos			
224,4	120/1				Kl. Demophilos			
225,1	121/2				Phlaouios Sophokles			
225,2	122/3							T. Phl. Alkibiades
225,3	123/4							Kasios Diogenes
				Inscr. Delos 2536				
225,4	124/5							Phl. Euphanes
226,1	125/6							G. Ioulios Kasios

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe Archon
226,2	126/7	*IG* III 735 + Add. 69a	Tib. Kl. Herodes					
226,3	127/8	*IG* II/III² 2040	Memmios . . . ? . . . . ros					
226,4	128/9							Kl. Dometianos
227,1	129/30							
227,2	130/1							Tib. Kl. Lysiades
227,3	131/2	*IG* II/III² 1763	Kl. Philogenes					
227,4	132/3							Salloustianos
228,1	133/4							Aiolionos
228,2	134/5							
228,3	135/6							
228,4	136/7							
229,1	137/8							
					IG II/III² 1765			
229,2	138/9	*IG* II/III² 1765	Praxagoras			Chrysogonos	Phlya	V
229,3	139/40	*IG* II/III² 2044	Phl. Alkibiades					
229,4	140/1							Tib. Kl. Attalos
230,1	141/2							
				Inscr. Delos 2538				Po. Ail. Philcas
230,2	142/3							
								Po. Ail. Alexandros
230,3	143/4							
								Po. Ail. Biboullios Rouphos
230,4	144/5							
231,1	145/6	*IG* II/III² 2055	Phla. Arrianos					
231,2	146/7	*IG* II/III² 2057	Ti. [--					
231,3	147/8							Syllas
231,4	148/9							[---]
232,1	149/50							

232,2	150/1	*IG* II/III^2 2065	Ail. Ardys						L. Nounmios Menis D. Iounios Patron Tib. Kl. Demostratos Kuintos Alleios Epiktetos Lykomedes Dionysios
232,3	151/2								
232,4	152/3								
233,1	153/4								
233,2	154/5	*IG* II/III^2 2067	Praxagoras						⋮
233,3	155/6	*IG* II/III^2 2068	Popillios Theotimos						
233,4	156/7								Ail. Kallikrates
234,1	157/8								⋮
234,2	158/9	*IG* II/III^2 2079	Ti. Aur. Philemon Philades						
234,3	159/60								Ail. Alexandros
234,4	160/1								P. Ailios Hellen ho kai Pl[-
235,1	161/2	*IG* II/III^2 2085	Memmios epi bōmō						
235,2	162/3								Ail. Gelos
235,3	163/4	*IG* II/III^2 2086	Philisteides						
235,4	164/5								
						Hesp. 12, No. 23			
236,1	165/6					--- pos	Sphettos	VI	Sextos
					IG II/III^2 1773				
236,2	166/7				M. Balerios Mamertinos	Ph[---]os			
				IG II/III^2 1774	*IG* II/III^2 1774				
236,3	167/8				᾿Αναρχία	Mousaios	Phyle	VIII	
				IG II/III^2 1775 (cf. *Hesp.* 11, Nos. 18, 21)					
236,4	168/9		Tineios Pontikos	*IG* II/III^2 2097		Skreibonios	Halai	IX	
					IG II/III^2 1776		*Am. Journ. Philol.*, 64, p. 43		
237,1	169/70	*IG* II/III^2 2097	᾿Αναρχία			Kor. Menestheus	Azenia	X	
237,2	170/1								Phla. Harpalionos
237,3	171/2								Kl. Herakleides
237,4	172/3								Klaudios
						Hesp. 3, No. 43			
238,1	173/4					Eisidoros	Anagyrous	I	Biesios Peison
238,2	174/5								M. Mounatios Maximianos Ouopiskos
238,3	175/6								Ar. Epaphrodeitos

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe	Archon
238,4	176/7								⋮
									Aeschines
239,1	177/8								⋮
239,2	178/9								⋮
									P. Pomp. Hegias
239,3	179/80								⋮
239,4	180/1								Athenodoros ho kai Agrippas
240,1	181/2				Tib. Memmios Phlakkos				
				IG II/III² 1739	*Hesp.* 4, No. 11				
240,2	182/3				'Αναρχία	Mystikos	Eroiadai	X	
240,3	183/4				Loukios Gellios				
					Xenagoras				
240,4	184/5								Demostratos
						Hesp. 11, No. 36			
241,1	185/6					Theo--	Athmonon	XIII	Philoteimos
						IG II/III², 1796			
241,2	186/7					Klodios Antiochos	Lamptrai	I	Orbios Thisbianos
						Hesp. 11, No. 4			(cf. *Hesp.* 32, 318)
241,3	187/8					Aur. Hyakinthos	Gargettos	II	Ioulios
									Hierophantos
						Hesp. 11, No. 23			
241,4	188/9					Eisodotos	Angyle	III	Kommodos
242,1	189/90								Menogenes
						Hesp. 11, No. 6 (cf. 18, p. 18)			
242,2	190/1					Aphrodisios	Phlya	V	G. Peinarios Proklos
						Hesp. 11, No. 5			
242,3	191/2					Eukarpos	Sphettos	VI	Tib. Kl. Bradouas Attikos
242,4	192/3								G. Helbidios Sekoundos
243,1	193/4								Kl. Dadouchos
243,2	194/5								Aur. Philisteides
243,3	195/6								[Koi]nt---s
243,4	196/7								Phlabios Straton
244,1	197/8								

244,2 198/9
244,3 199/200
244,4 200/1
245,1 201/2
245,2 202/3
245,3 203/4
245,4 204/5
246,1 205/6
246,2 206/7
246,3 207/8
246,4 208/9
247,1 209/10
247,2 210/11
247,3 211/2
247,4 212/3
248,1 213/4
248,2 214/5
248,3 215/6
248,4 216/7
249,1 217/8
249,2 218/9
249,3 219/20

IG II/III² 2197

IG II² 1077
Phl. Diogenes Rhodon Marathon XI

Dionysodoros
T. Phlab. Sosigenes
Xenokles
Phlab. Eiach[chagog]os
Agathokles
Aurelios Dem-
Domitios Aristaios
or
Phlab. Eiach[chagog]os
Agathokles
Aurelios Dem-
Domitios Aristaios
Skribonios Kapiton
G. Kuintos Himertos
᾿Αναρχία
G. Kasios Apollonios
Phab. Dadouchos
Kl. Phokas
Pompeios Alexandros
Aur. Dionysios Dionysiou
Aur. Kalliphron
Tib. Kl. L[-
Gellios Xenagoras Ne(oteros)
Aur. Dionysios Kallippou

Ol.	Year	Testim. to date	Archon	Testim. to sequence	Archon	Secretary	Deme	Tribe Archon
249,4	220/1	Synk. *Chr.* p. 400 (Dind.)	Philinos					
250,1	221/2							Dometios Arabianos
250,2	222/3							G. Kuintos Kleon
250,3	223/4							Hiereus An--
250,4	224/5							Tib. Kl. Patroklos
251,1	225/6							Le. Dionysodoros
251,2	226/7							Mounatios Themison
251,3	227/8							G. Pinarios Bassos
								P. Pomp. Hegias
251,4	228/9							
								[-Maratho]nios Ne(oteros)
252,1	229/30							
								M. Oulpios Eubiotas Leuros
252,2	230/1							Mar. Aur. Kalliphron ho kai Phronteinos
252,3	231/2							Kasianos
252,4	232/3							
253,1	233/4							Kl. Teres
253,2	234/5							Epiktetos
253,3	235/6							
253,4	236/7							
254,1	237/8							
254,2	238/9							Kasianos Hierokeryx
254,3	239/40							Phlab. Asklepiades
254,4	240/1							
255,1	241/2							
255,2	242/3							
255,3	243/4							
255,4	244/5							Aur. Laudikianos
256,1	245/6							
256,2	246/7							
256,3	247/8							
256,4	248/9							

257,1	249/50				
257,2	250/1				P. Herennios Dexippos
257,3	251/2				Kornelianos
257,4	252/3				
258,1	253/4				
258,2	254/5				
258,3	255/6				
258,4	256/7				
259,1	257/8				
259,2	258/9				
259,3	259/60				
259,4	260/1				
260,1	261/2				
260,2	262/3				L. Phla. Philostratos
260,3	263/4				
260,4	264/5	*Vit. Gall.* XI, 3	Gallienus		
				ca. 275	Tit. Phl. Mondon
				300–350	Hegeias
				Fin. IV	Phaidros
	386/7				Hermogenes
				425–450	Theagenes
	484/5	*Vit. Procli* 36	Nikagoras		

3. Spartan Ephors

Although the Spartan king-list and the names of Spartan kings were extensively used in genealogical reckoning (q.v.), the reigns do not seem to have been used for defining individual years; no events are given in terms of a specific year of a king.[1] At Sparta, the names of ephors were attached to years, as at Athens archons' names were used, and a system of chronology based on ephor names was in existence by the latter part of the fifth century. This use of ephor names for chronological purposes is first encountered in the famous passage of Thucydides, II, 2, in which the historian dates the outbreak of war by the Athenian archon, the priestess of Hera at Argos, and the ephor Ainesias at Sparta.

The application of the ephor list to chronology before the fifth century has been extensively argued. The fundamental issue involves the date of the introduction of the ephorate and the first ephor, said by Plutarch (*Lyc.* 7) to have been named Elatos, dated in the reign of King Theopompos, but complicated by the involvement in that issue of Chilon, the only other dated ephor before the fifth century, said to have been the first ephor and dated in Ol.56 (556–553/2) by Diogenes Laertius I, 68. The difficulty in resolving this contradiction is increased by the involvement in it by Plutarch of Lykourgos, in his statement (*Lyc.* 7) that Elatos came 130 years after Lykourgos.

The difficulty the ancients had with the date of Lykourgos is notorious; Timaios even proposed that there were two (Plut. *Lyc.* 1). Aristotle made him a contemporary of Iphitos and co-founder of the Olympic games, while Xenophon (*Lac.* 8) has him a contemporary of the Herakleidai. More precise information is offered by later sources, but no resolution of contradictions among them is possible without emendation of texts and extensive re-interpretation.[2] Jacoby concluded that in the chronology of Apollodorus a consistent schema could be worked out with Lykourgos in 885/4,[3] and, following the 130 years of Plutarch, 754/3 for the first ephor, which would be consistent with other evidence.[1] Turning to Chilon, Jacoby argued from Diog. Laert. I, 68,[2] where the contradiction is stated that "he was ephor in the 56th Olympiad – but Pamphila says in the 6th and that he was the first ephor" that the 56th Olympiad, 556/3 B.C., is the right date for Chilon, and that the reference to the 6th is due to his assignment as first ephor (erroneously), since the Apollodoran date for the first ephor (754/3) falls in that 6th Olympiad.[3] The date of 556/5 for Chilon is supported by Jerome,[4] while 555/4 would seem to be suggested by Diogenes'equation with Euthydemos, assigned to that year by the Marmor Parium (v. Athenian Archon list). Discoveries subsequent to 1902[5] have brought Jacoby to give greater credence to 556/5 as the starting place of the ephor list, suggesting that then only did the office become important enough to become the means of dating.[6]

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[1] Except an occasional year date by very late sources, e.g., the lawgiving of Lykourgos in a specific year of Alkamenes by Synkellos, I, p. 349, ed. Dind. (See below, note 3).

[2] Apart from the later writers, e.g., Porphyry, with 108 years from Lykourgos to Ol. 1, 1 (Eus. *Chron.* ed. Schoene, I, p. 190) as Cicero, *De re publ.* II, 18, based probably on the same figure of Eratosthenes, Clemens, *Strom.* I, 138 (ed. Dind., p. 112) contradicted by the many variants in the tables of Jerome and the Armenian version of Eusebius, there is contradiction in the classical sources. Xenophon, *Lac.* 8 makes Lykourgos contemporary with the Herakleidai, while Thucydides, I, 18, would place him a little over 400 years before the Archidamian War. There is more than enough contradiction.

[3] *Apollodors Chronik*, *Philologische Untersuchungen* 16, 1902. Various reconciliations, apart from the contradictions above, note 2, must be made. The evidence of Eusebius and Jerome (a. Abr. 1221) and Synkellos' and Eusebius' reference to year 18 of Alkamenes may be explained by a reference to a second Lykourgos (Timaios) an explanation hinted at by a reference to a *superiorem Lycurgum* in Cic. *Brut.* XL, as well as by the remark of Cicero in *De re publ.* II, 18, *nam centum et octo annis postquam Lycurgus leges scribere instituit, prima posita est Olympias, quam quidam nominis errore ab eodem Lycurgo constitutam putant.* Jacoby's reasoning,

The only other early ephor is the shadowy and perhaps non-existent Asteropos.[7] The historicity of the list before the fifth century is open to question,[8] but since there

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pp. 108–118 and 122–127, is intricately connected to his whole reconstruction of Apollodorus' chronology.

[1] Jacoby, pp. 138–142, with the emphasis on the 130 years of Plutarch, also argues the issues in connection with the ephorate of Chilon, pp. 183–188. Citing the confirmatory evidence of Eusebius (p. 139), Jacoby uses the famous passage of Diog. Laert. I, 68 (see below, note 2) to show that the confusion in the assigment of Chilon as first ephor supports the attribution of the first ephorate to 754/3 in the Apollodoran chronology. Kiechle, re-examining the matter, *Lakonien und Sparta*, München, 1963, pp. 220–232, in light of the more recent discussions and citing the bibliography subsequent to Jacoby, comes to essentially the same date as Jacoby, 754/3 or 753/2. It is worth noting that the validity of the establishment of the Apollodoran date of 754/3 remains applicable to reckoning with that chronological scheme, even apart from the real date of the reform.

[2] Γέγονε δὲ ἔφορος (Χίλων) κατὰ τὴν πεντηκοστὴν ἕκτην Ὀλυμπιάδα (Παμφίλη δέ φησι κατὰ τὴν ἕκτην, καὶ πρῶτον ἔφορον γενέσθαι) ἐπὶ Εὐθυδήμου, ὥς φησι Σωσικράτης. καὶ πρῶτος εἰσηγήσατο ἐφόρους τοῖς βασιλεῦσι παραζευγνύναι. Σάτυρος δὲ Λυκοῦργον.

[3] *Apollodors Chronik*, pp. 139 and 183–188.

[4] J. Fotheringham, Eusebii Pamphili *Chronici Canones*, London, 1923, p. 181.

[5] Archeological discoveries, *BSA* 12, 1905/6–16, 1909/10, publishing "Excavations at Sparta" over those years, show a change in Sparta towards the end of the 7th century. J. Wells, *Studies in Herodotus*, Oxford, 1923, pp. 44–52, has argued for Chilon as the effector of the reforms, and that in any case, the lawgiver, whoever he was, is to be placed at the end of the 7th – early 6th centuries, and that he credited the legislation to a "fictitious person" (p. 47). V. Ehrenberg, *Neugründer des Staates*, München, 1925, "Der Gesetzgeber von Sparta," pp. 5–54, discusses the development of early Sparta and too concludes that the legislation and the leglislator is to be placed in the 6th century. "Vielleicht heißt er Chilon" (p. 50). The general books about Sparta in recent years have not delved very deeply into these problems, certainly not into the problems of Apollodoran chronology, until Kiechle's re-examination, *Lakonien und Sparta*, 1963, pp. 183–202, setting forth the situation in Sparta in the 7th century, and investigating the reasons for the early date of Lykourgos in the later tradition.

[6] Jacoby, *Atthis*, Oxford, 1949, p. 395, note 24: "but it is subject to doubt whether a list of those early ephors existed. In any case it was only in 556/5 B.C. that the office became so important as to cause dating by ephors instead of kings." See also *ibid.* p. 353, note 3.

[7] Mentioned by Kleomenes (Plut. *Cleom.* 10) as responsible for an aggrandizement of the power of the ephorate. Cf. Michell, *Sparta*, Cambridge 1952, p. 125, for bibliography of Asteropos; Kiechle, p. 240, discusses the religious implications of the passage.

[8] Cf. Kiechle, p. 233, and Jacoby, *Atthis*, Oxford 1949, p. 282, note 55, who asks whether Charon might have extended the list back beyond 556/5.

are so few names for the early period, that problem has relatively little significance for the application of ephor dating to chronology. With the fifth century bringing occasional epigraphic dating, references by Thucydides, and the list of eponymous ephors in office during the Peloponnesian War in Xenophon *Hellenica* II, 3, 10, we have a list which is useful to chronology. There is no reason to doubt the correctness of the assignment of the eponymous ephors to years from the fifth century on, and some of the names in Xenophon's list are confirmed by Thucydides. Whether the list in Xenophon is Xenophon's own or is a later interpolation as taken by Keller,[1] its existence and confirmation by the contemporary Thucydides is proof that the list of eponymous ephors was maintained from the end of the fifth century, at the very latest.

Date	Eponymous Ephors	Evidence	Other Ephors	Evidence
754/3	Elatos	Plut. *Lyc.* 7		
— —	Asteros	Plut. *Cleom.* 10		
556/5 or 555/4	Chilon	Diog. Laert. I, 68; Jerome, cf. above, p. 239, n. 4.		
447/6			Kleandridas	Suid. s. v. ἔφοροι
before 433/2	Autokrates	*IG* V 1 1229		
before 433/2	Daiochos	*IG* V 1 1228		
before 433/2 or after	Aristeus	*IG* V 1 1230; 213	cf. Poralla, *Prosopogr. d. Lak.* pp. 42–43	
404/3	Echemenes	*IG* V 1 213		
404/3	Euippos	*IG* V 1 213		
2. h. 5 cent.	Ekprepes	Plut. *Agis* 10		
433/2	Sthenelaidas	Thuc. I, 85; 8, 5; Paus. V, 3, 7, 11;	Perhaps not the eponymous ephor (and so perhaps not really ephor of this year.)	
432/1	Ainesias	Thuc. II, 2; Xen. *Hell.* II, 3, 10		
431/0	Brasidas	Xen. *Hell.* II, 3, 10; *et passim*		
430/29	Isanor	Xen. *Hell.* II, 3, 10		
429/8	Sostratidas	Xen. *Hell.* II, 3, 10		
428/7	Exarchos	Xen. *Hell.* II, 3, 10		
427/6	Hagesistratos	Xen. *Hell.* II, 3, 10; *IG* V 1 1231		
426/5	Angenidas	Xen. *Hell.* II, 3, 10		
425/4	Onomakles	Xen. *Hell.* II, 3, 10		
424/3	Zeuxippos	Xen. *Hell.* II, 3, 10		
423/2	Pityas	Xen. *Hell.* II, 3, 10		
422/1	Pleistolas	Xen. *Hell.* II, 3, 10 Thuc. V, 24	Damagetos Chionis Metagenes Akanthos	Thuc. V, 19 and 24. Four in the list after two kings and eponymous ephor.
421/0	Kleinomachos	Xen. *Hell.* II, 3, 10	Kleoboulos Xenares	Thuc. V, 36 Thuc. V, 46
420/19	Ilarchos	Xen. *Hell.* II, 3, 10		
419/8	Leon	Xen. *Hell.* II, 3, 10		
418/7	Chairilas	Xen. *Hell.* II, 3, 10		
417/6	Patesiadas	Xen. *Hell.* II, 3, 10		

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[1] O. Keller, Teubner edit. *Hell.*, 1890, followed in general by subsequent editors.

Date	Eponymous Ephors	Evidence	Other Ephors	Evidence
416/5	Kleosthenes	Xen, *Hell.* II, 3, 10		
415/4	Lukarios	Xen. *Hell.* II, 3, 10		
414/3	Eperatos	Xen. *Hell.* II, 3, 10		
413/2	Onomantios	Xen. *Hell.* II, 3, 10		
413/2	Onomantios	Xen. *Hell.* II, 3, 10	Endios	Thuc. VIII, 6, etc.
412/1	Alexippidas	Xen. *Hell.* II, 3, 10 Thuc. VIII, 58		
411/0	Misgolaidas	Xen. *Hell.* II, 3, 10		
410/09	Isias	Xen. *Hell.* II, 3, 10		
409/8	Arakos	Xen. *Hell.* II, 3, 10 etc.		
408/7	Euarchippos	Xen. *Hell.* II, 3, 10		
407/6	Pantakles	Xen. *Hell.* II, 3, 10; Ael. *nat. anim.* 11, 19		
406/5	Pityas	Xen. *Hell.* II, 3, 10; I, 6, 1		
405/4	Archytas	Xen. *Hell.* II, 3, 10	Skiraphidas Phlogidas	Plut. *Lys.* 17
404/3	Eudios	Xen. *Hell.* II, 3, 10	Naukleidas	Xen. *Hell.* II, 4, 36
betw. 403/2 & 400/399	Thuionidas	*IG* V 1 1564 cf. Poralla p. 66	Aristogenidas Archistas Sologas Phedilas	*IG* V 1 1564
395/4			Diphridas	Plut. *Ages.* 17 etc.
betw. 393 & 361	Lakratidas	Plut. *Lys.* 30		
372/1			Prothoos	Xen. *Hell.* VI, 4, 2; Plut. *Ages.* 28
370/69			Antalkidas	Plut. *Ages.* 32
338/7			Antiochos	Plut. *Mor.* 192 B; 217 F
331/0 or 330/29			Eteokles	Plut. *Mor.* 235 B Ael. *Var. Hist.* 11, 7
4. cent.	Eudamidas	*IG* V 1 1232		
4. cent.	Eumelidas	*IG* V 1 1233		
4. cent.			Epitadeus	Plut. *Agis* 5

For further evidence, see P. Poralla, *Prosopographie der Lakedaimonier*, under individual names. I have followed Poralla, in general, for the dates.

4. *Generational Reckoning*

Before the proliferation of list-systems of marking the passing of years, systems like Olympiad years or archon lists, through which it was possible to calculate backwards to determine the numbers of years intervening between events, the passage of years was reckoned in terms of generations. Since the number of years attributed to the length of the generation varied, the task for the modern historian lies in the determination of the generation-length used by differing historians for different purposes in antiquity.

The most specific statement about generation-length is that of Herodotus II, 142: . . . ἀπὸ τοῦ πρώτου βασιλέος ἐς τοῦ Ἡφαίστου τὸν ἱρέα τοῦτον τὸν τελευταῖον βασιλεύσαντα μίαν τε καὶ τεσσεράκοντα καὶ τριηκοσίας ἀνθρώπων γενεὰς γενομένας καὶ ἐν ταύτησι ἀρχιερέας καὶ βασιλέας ἑκατέρους τοσούτους γενομένους. καίτοι τριηκόσιαι μὲν ἀνδρῶν γενεαὶ δυνέαται μύρια ἔτεα· γενεαὶ γὰρ τρεῖς ἀνδρῶν ἑκατὸν ἔτεά ἐστι. μιῆς δὲ καὶ τεσσεράκοντα ἔτι τῶν ἐπιλοίπων γενεέων, αἳ ἐπῆσαν τῇσι τριηκοσίησι, ἐστὶ τεσσεράκοντα καὶ τριηκόσια καὶ χίλια ἔτεα.

The arithmetical error here is notorious, as Herodotus obtained the total 11,340 years instead of 11,366 years from his multiplication, and Molly Miller argues from this error that Herodotus could not have been familiar with manipulation of 33⅓ year generations, as any frequent use of this factor would quickly reveal that totals with it must always be figures ending either in 33⅓ or 66⅔.[1]

Although Herodotus makes this categorical statement about the length of the generation, it is quite clear that this figure does not always provide the multiplication factor with which he arrived at a total of years from a number of generations. In I, 7 he has a figure of 505 years for the 22 generations of the Lydian dynasty; the length of years per generation here is clearly 22 21/22 years, or, in round numbers, 23 years per generation, perhaps calculated with a subtraction of 1 year for an indeterminable reason (505 = 22 × 23 (–1)). This figure of 23 years is the most easily demonstrable, and indeed may be the only generation figure which can be regarded as conclusively proved for Herodotean reckoning apart from the calculation in II, 142. Although all modern scholars seem to agree that Herodotus was not consistent in his calculation of generations, they do not agree about the different figures, and by various means of calculation they arrive at, *variatim*, 33⅓ years (Von Fritz,[2] Prakken[3]) 40 years (Von Fritz, Prakken)[4], 39 years (Miller[5]). These figures are achieved by interpretation of how generations are to be applied[6] or by the acceptance of tolerances for round figures,[7] for nowhere besides the comment in II, 142 or the related generations/total years in I, 7 does Herodotus give us both factors of his calculation. It would seem, however, from the attribution of 900 years between Herakles and Herodotus himself in II, 145, that we must accept "long-generations" (39–40?) years in addition to the 23 year generations used in I, 7 and the 33 ⅓ year generations proposed in II, 142.

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[1] "Herodotus as Chronographer," *Klio* 46, 1965, p. 113.

[2] "Herodotus and the Growth of Greek Historiography," *TAPA* 67, 1936, pp. 315–340.

[3] D. W. Prakken, *Studies in Greek Genealogical Chronology*, Lancaster, Pa., 1943, pp. 23, 35f., 47.

[4] Von Fritz, *op.cit.*; Prakken, *op.cit.*, pp. 20, 47; and, with more elaboration of calculation, "Herodotus and the Spartan King Lists," *TAPA* 71, 1940, pp. 460–472.

[5] "Herodotus as Chronographer," *Klio* 46, 1965, pp. 109–128.

[6] E.g., by excluding Croesus' years from the Mermnad king list in I, 15–26 gives 156 years to 4 kings = 39×4 (Miller, p. 122) for 39 year generations, while by including Croesus, the yield is 170 years for 5 kings = 34×5 (Prakken, *Studies*, p. 23) for 33⅓ year generations.

[7] The closest approximation to the 900 years between Herodotus and Herakles in II, 145 is 39×23 (21 generations in VII, 204 & VIII, 131 + the generation after Leonidas and the generation of Herakles himself; cf. Miller, p. 115) = 897. But an acceptable approximation can be derived from 40×22 (adding only the generation after Leonidas) = 880; or 40×23 = 920. The nature of the generation cannot be proved conclusively from the text, although since one can hardly assume a calculation using more than 23 generations, a figure in the 39–40 year generations must be the one used.

In Thucydides too there is evidence of chronology based upon genealogical reckoning. I, 14 alludes to genealogical chronology, and, although the scope of Thucydides' history does not often touch upon matters which generation-reckoning would affect, such calculation may be involved to produce: the figure of 300 years "before the end of this war" for the date that Ameinokles built ships for the Samians (I, 13); the figure of 260 years on the same base date for the oldest sea battle (I, 13); 400 years, same base, for the stability of the Spartan polity (I, 18). Prakken believed that these figures may have been arrived at through genealogical calculation, and proposed 40 years for the generation length.[1] Miller finds in the dates for the Sicilian foundations a common factor of the number 9, from which she deduces a generation length of 36 years.[2]

The development of the archon and Olympiad systems of chronology ended dependence upon generation-count as a means of recording the passing of time, and once the recollected data of the centuries prior to the evolution of the systems had been worked into the new framework, generation count could be dispensed with for the period covered by any specific system. Thus, after the fifth century, events could be located in terms of Olympiads from 776 on, and chronographers could abandon generation-count as a means of referring to events after the first year of the first Olympiad. Even so, there remains for the early period some trace of the generation-count, since it must have been by use of genealogical chronology, at least in part, that history was mounted on the framework of Olympiads. For example, in Eusebius (Jerome): the period from Ol.1, 1 to the first 10 year archon is 23 years (776–753); from Ol.1, 1 to the last year of the 10 year archons is 92 years (776–684) = 23 × 4. There is, regardless of all the difficulties in establishing the dates indicated by the text of Eusebius, at least the suspicion that the location of these events on the Olympiad list owes something to the use of 23 year generations as intervals.[3] And if we are to allow the possibility that generation lengths were used in the establishment of the tradition which dated events of the seventh to fifth centuries in terms of the

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[1] *Studies*, pp. 58f.; 65–68; 71f.

[2] The discussion will appear in her forthcoming *Sicilian Colony Dates*. Briefly, her strictly *Thucydidean* figures are: Syracuse–Gela, 45 years; Gela–Casmenae, 45 years; Casmenae–Camarina, 45 years; Camarina–Acragas, 18 years. These figures are not all actually given, *qua* numbers, by the text, but are achieved by aligning the relationships as given in the account of the foundations. It is perhaps worth mentioning that of the figures actually given by Thucydides here, the following are divisible by 9: Syracuse–Gela, 45; Gela–Acragas, 108; Syracuse–Camarina, 135. Prakken, in his examination of the colony foundations (*Studies*, p. 70f.) could find no common numerical relation, particularly when the relation on the basis of 33⅓ year generations was tried. Miller's hypothesis of 39 year generations would fit rather well with Prakken's hypothesis of 40 year generations for the figures in book I, 13 and 18, although there does not seem to be a precise number of generations correlating with figures of 300, 260, 400, based either on the number 9 or 39 year generations.

[3] For a 27 year generation used by Eusebius' source, see M. Miller, "The Herodotean Croesos," *Klio* 41, 1963, pp. 64–67.

Olympiads, the prossibility becomes an increased consideration in evaluating the later records of the dates of events prior to the first Olympiad. Indeed, Diodorus I, 5, 1 gives us a clear indication of at least one procedure used: Apollodorus placed the return of the Herakleidai 80 years after the Trojan War, and from that to the first Olympiad gave 328 years, reckoning the time by the Lacedemonian kings.[1]

Although genealogical calculation must be assumed to have served the purposes of almost all historical chronology before the fourth century, and must also underlie most of the precise chronology of pre-fifth century Greece in all subsequent sources, it is extremely difficult to apply the control of generation reckoning to an understanding of the means a specific author used to arrive at a date. The difficulties presented by Herodotus and Thucydides have already been noted, and it is clear that even single authors may not be, indeed probably are not, completely consistent in the application of generation length. At the early stages of the tradition the choice of different generation lengths may be due to a conscious evaluation of the meaning of "generation" in the society being treated, as for example, eldest son generations are shorter than simple succession generations, and the measurement of the duration of a dynasty might call for the shorter factor if it was known to be eldest son succession.[2] These deliberate choices of generation length will complicate the task of evaluating the meaning of a date given in terms of generations,[3] and the complexity introduced by this possibility of different generation lengths (deliberately chosen or not) makes even more difficult the application of the chronography after the period in which generation calculation was necessary for any chronology. For the Hellenistic period, our sources are not even extant, and so we have no connected text for this critical period when much of this adaptation of the genealogical system was occurring. The evidence on which we base our views of the chronological structure of Hellenistic historiography comes in the first instance from quotations by Diodorus, and the majority of the remainder of our information comes from the late chronographers. These, using a wide variety of sources who in turn had drawn on the chronographic variety created by the differing genealogical counts, present accounts and tables into which have been woven threads of many different schemes. In other words, the early dates in the late chronographers derive ultimately from calculations made genealogically, but different calculations may have been combined and re-combined before reaching the later writers, so that there is no apparent cohesion among these early dates. In order to use this material for undertaking an investigation of the chronography of the sources, it would first be necessary to untangle the various traditions in these late writers, and that, in the final analysis, may never be possible.

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[1] For intervals between events in Apollodorus' work, cf. F. Jacoby, *Apollodors Chronik*, *Phil. Untersuchungen* 16, 1902.

[2] For a demographic analysis of generation lengths, see Molly Miller and J.A. Newth, *Sicilian Colony Dates*, chapter V. The authors examine age at death to determine survival rates, and develop a model of an ancient population. The model produces a figure compatible with 23 year generations for eldest son succession, and compatible with 27 year generations for the average reproductive period for all children. So too, 36 and 39 year generations are supported by demography if succession is through cousinhoods. The view that chronographers were so sophisticated in their methods depends, at least to some extent, on the argument by Miller in *Studies in Greek Chronology*, Leiden, 1968.

[3] I.e., author A, using 23 year generations for 5 generations, who states that an event took place 115 years before X, *means the same thing* as author B, who, using 27 year generations, states that it occurred 135 years before X.

5. *Eras*

Seleucid

In 311 B.C. Seleukos Nikator began the enumeration of his satrapal years at Babylon, beginning them, as an astronomical tablet of 222 B.C. expresses it, with "Year 1 of Seleukos which corresponds to year VII."[1] The year VII is year 7 of Alexander IV, which began in Babylon on 1 Nisan (= 3 April) 311 B.C. This date became for the Babylonians the epoch of the Seleucid era, and although, as we shall see, a date in autumn 312 was the epoch of that era for the Greeks, the Babylonian epoch of 311 persisted and was used for a number of purposes for some time to come. This epoch is reflected in the Babylonian astronomical tablets of the later period,[2] and this entered Greek astronomical practice as the era κατὰ Χαλδαίους, e.g., Ptolemy, *Almagest* cites a number of observations according to this era[3] and the astronomy is satisfactory only on an era based on an epoch of 311 B.C.[4]

According to the tables of Jerome,[5] the accession year 1 of Seleukos was Ol.117, 1, which, if reckoned according to the Olympian year, would have been summer 312 – summer 311, appropriate to the Babylonian reckoning, but also to a reckoning with an epoch in autumn of 312. This epoch seems to have been used almost universally in Greek areas, both for civil reckoning and for historical purposes. Inscriptions and coin dates have long been known to demonstrate that the era in use could not have had an epoch later than fall 312 B.C.,[6] and the difference between the "Babylonian" count and the "Greek" count obtains from the procedures followed by Seleukos in establishing his regnal years, as Bickerman has explained.[7] When Seleukos took the title of King of Babylon, his regnal years were counted in Babylonian fashion, from Nisan 1, but when he later adopted the title βασιλεύς, he used Macedonian reckoning for the Greeks and Macedonians, thus pushing the beginning of the first year back to autumn of 312, the period when the Macedonian regnal year began.[8]

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[1] Translation and tablet cited by Olmstead, "Cuneiform Texts and Hellenistic Chronology," *ClPhil.* 32, 1937, p. 4. Cf. also S. Smith, *Rev. Assyr.* 22, 1925, p. 190.

[2] Cf. F.X. Kugler, *Sternkunde und Sterndienst in Babel*, 1907–1935.

[3] See above, p. 140.

[4] For discussion, cf. Kubitschek, *Grundriß* p. 73; Ginzel, I, p. 136.

[5] Eusebius, Chron. Can. ed. Schoene, II, p. 117.

[6] Argued, e.g., by Ideler, *Handbuch* I, p. 448.

[7] E. Bickerman, "Notes on Seleucid and Parthian Chronology," *Berytus* 8, 1944, pp. 73–76.

[8] As Bickerman has pointed out, (Chronology, 1968, p. 71, citing Welles, *Royal Correspondence in the Hellenistic Period*, 1934, 18 [i.e.,

The era was broadly used all over the area of Seleucid dominion during the Hellenistic period,[1] and could also be used for dating by historians. Josephus used it[2], and it was adopted for contract purposes by the Hebrews as well as by some Arabian sources, and spread extensively through the East.[3] Of all the eras which came into use in the Hellenistic and Roman periods, it was probably the era which was most broadly used and most widely understood.

Types of Eras

The number of eras which came into use and then expired to be replaced by yet others eras during Hellenistic and Roman times is probably not infinite, but I have not been able to find the end of them. A large number of eras are specifically attested in documents and may be accepted as true eras,[4] while others must be deduced from such evidence as exists. Cities might introduce new eras on the occasion of their liberation,[5]

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pp. 90–99]) the year began between 1 Loios and 1 Dios, i.e., between late summer and early autumn. For local reckoning, however, each year of the era began according to the calendars in use in a given area, yielding a great number of possibilities (see above, pp. 142) (Seleucid Calendar) and 174 ff. (Eastern Provinces) The result of 1 October for the epoch, derived from Ulug Beg's statement of the precise number of days elapsed between the epoch of the Seleucid era and that of the era of the Hegira (cf. Ginzel III, p. 41; Kubitschek *Grundriß*, p. 71) obscures the fact that 1 October (i.e. possibly Antioch, q. v.) is only one possibility for antiquity, although it seems to have been the possibility selected in this case as an epoch in a later discription of the nature of the era.

[1] For specific examples, cf. indices to volumes of inscriptions; Ginzel III, pp. 41 ff., lists such cities as Apamea, Epiphania, Emesa, Damascus, Palmyra, pointing out that the era was in use in Syria, Phoenicia, North Syria, Lebanon, and that some cities which used it, like Tyre, threw it off when freedom from the Seleucids came, and began their own eras. Many texts which have era numbers have been dated according to the Seleucid era; many are doubtless right, and attest the use of the era in Arabia (e.g., *SEG* XX 411) Asia Minor (e.g. *MAMA* VI 154). We certainly do not have anything like a complete account of all the places which used the Seleucid era or the duration of its use in places where it is attested. Kubitschek's remark (*Grundriß* p. 72), "Die Belegstellen für die Seleukidenära müssen noch zusammengestellt und untersucht werden," still remains true. Such a study would throw a great deal of light on political developments in the cities of the East.

[2] *Ant. Jud.* XII, 246 ἔτει ἑκατοστῷ καὶ τεσσαρακοστῷ καὶ τρίτῳ μετὰ τοὺς ἀπὸ Σελεύκου βασιλεῖς; XIII, 213 μετὰ ἑβδομήκοντα καὶ ἑκατὸν ἔτη τῆς ᾿Ασσυρίων βασιλείας ἐξ οὗ χρόνου Σέλευκος ὁ Νικάτωρ ἐπικληθεὶς κατέσχε Συρίαν.

[3] For brief discussions, cf. Kubitschek, *Grundriß* p. 71; Ginzel I, 136, 263, 305, II, 59 ff. Al Biruni, calling it the Era of Alexander (Tr. by C.E. Sacau, London, 1879) attests its continued use.

[4] E.g.: an era of the apotheosis of Augustus, epoch 14 A.D., attested at Samos, *Ath. Mitt.* 44, 1919, p. 39, No. 31a; the era called Σεβαστόν, one of the eras in use in Macedonia (epoch 148) has an epoch of 32 B.C., M. Tod., "The Macedonian Era Reconsidered," *Studies Presented to David M. Robinson* II, pp. 382–397, and earlier discussions there cited; the Gerasene era τῆς πόλεως *Inscr. Gerasa* 296, with an epoch of 63 B.C., C.C. McCown, "The Calendar and Era of Gerasa," *TAPA* 64, 1933, pp. 77–81.

[5] E.g., Aradus, with an epoch of 259 B.C., H. Seyrig, *Syria* 28, 1951, pp. 191–220, and esp. p. 213; Tyre, 275 or 274 B.C., Ginzel, III, p. 45. Laodicea, 82 or 81 B.C., H. Seyrig, *Syria* 27, 1950, pp. 27–28; Apamea, 41 B.C., *ibid.* pp. 16–19; Tripolis of Phoenicia, between 105 and 95 B.C., *ibid.* p. 42. Such eras are usually deduced rather than explicitly attested. A number of such eras are connected with Pompey's freeing of cities, to create "Eras of Pompey."

others might adopt eras founded on a battle or victory as an epoch, and whole areas might use as an epoch the date that they became Roman provinces. Further, eras were created by actions taken or victories won by Roman generals. Thus, Pompey's activites in the East in the sixties of the first century B.C. generated a number of eras with different epochs,[1] often called "Pompeian" eras, and similarly, "Caesarian" eras arose two decades later.[2] Perhaps the best known of these victory eras is the era of Actium, explicitly denoted by a number of texts. The epoch of the era was generally the date of the battle of Actium on September 2, 31 B.C.,[3] although apparently a year within which Actium fell, with an epoch of 32, could serve as well.[4] The era was used quite broadly.[5]

Provincial eras are also known. For example, in Macedonia an era was reckoned from 148 B.C., when that area became a Roman province.[6] Similarly, the creation of the province of Achaea in 146 B.C. created also an era with that epoch,[7] just as other provinces acquired other eras.[8]

Eras proliferated in antiquity, and many of those which have been posited by moderns on the basis of evidence like that from numerals on coins have been revealed as false.[1] Eras were generated not only events, but were created retrospectively as aids to the study of historical chronology. There has been no serious attempt to assemble and argue all the evidence which pertains to eras, although some handbook treatments exist,[2] and the scholar who must work with a specific era is probably reduced, at least for the local city eras, to examining all the available evidence to come to a new and satisfactory conclusion.

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[1] In Palestine, the "Pompeian" era may be found in the decapolis, *inter alia*, and even there, with various epochs; Ginzel III, p. 47 points to an epoch of 64 B.C. for Gadara, 63 for Gerasa (see above, p. 247, note 4) and Philadelphia. Apamea had an epoch of 66, Seyrig, *Syria* 27, 1950, pp. 18–19, as did a similar era at Aradus, *ibid.* pp. 6–14; an epoch of 64 is known from Arethusa, *ibid.* p. 21, and Scythopolis, Seyrig, *Rev. Numismatique*, Ser. 6, 6, 1964, pp. 65–67; an era in Tripolis of Phoenicia may be one with a 64 or 63 epoch, *Syria* 27, 1950, pp. 141–142, while that of Demetrias in Phoenicia may also be in 63, *ibid.* p. 52, and some "Pompeian" era is argued for Orthosia, *Syria* 31, 1954, p. 77. I repeat the caution that these eras and epochs are mostly deduced, and largely from coinage. Ginzel III, p. 49, argues the era attested on coins of Gaza to have an epoch of 61 B.C. on the basis of the Chronicon Paschale, giving Ol. 179, 4 = 61 B.C. as the epoch.

[2] The battle of Pharsalus seems to have provided the epoch, in general, i.e., 48 B.C., although differences in local calendars might have pushed the epoch back to 49 in some cases, as, e.g., Antioch on the Orontes, Ginzel III, p. 43 and Seyrig, *Syria* 27, 1950, p. 6; Laodicea had an epoch of 48, Ginzel III, p. 44, Seyrig, *op.cit.*, pp. 26–27, and cf. Eusebius *Chronicorum* II, ed. Schoene, which equates Probus' 2nd year, 277 A.D., to year 325 at Antioch, 324 at Laodicea.

[3] E.g., Antioch, Seyrig, *Syria* 27, 1950, p. 6; Arethusa, *ibid.* p. 20; Laodicea, *ibid.*, p. 31. There are places about which the nature of the era is uncertain, e.g., Byblos, Actian or Pompeian, Seyrig, *Syria* 31, 1954, pp. 69–71. Cf. also *ibid*, p. 77, for Botrys; for Seleuceia in Pieria, cf. Ginzel III, p. 44, and for Tripolis, *ibid*, p. 45.

[4] For 32 B.C. in Macedonia, cf. Tod, *Stud. Robinson* II, pp. 382ff., and previous studies there cited.

[5] In addition to Macedonia and Syria, above, Cyrene, *Hellenica* 11–12, 1960, p. 553; Dio Cassius LI, 1, speaks specifially of the reckoning of years from the battle of 2 September 31. For use at Samos and in Lydia, cf. Magie, *Roman Rule in Asia Minor* II, 1950, pp. 1289–1290.

[6] Tod, note 4, above. The article of F. Papazoglou, *BCH* 87, 1963, pp. 517–524, is of considerable interest, showing how regional differences in a single province may account for the continued use of one era, in this case the provincial, even after another era, here of Actium, had been adopted extensively in the rest of the province.

[7] Cf. Wilhelm, *Öst. Jahreshefte* 10, pp. 20ff.

[8] E.g., a Sullan era in the province of Asia, 85 B.C., Kubitschek, *Grundriß* p. 76; a Spanish provincial era of 38 (or 39) B.C., *ibid.*, p. 77; Mauretania, *ibid.*, p. 78, 40 A.D.; Arabia (Bostra) 106 or 105 A.D., *ibid.*, pp. 80–81; Dacia, 247 A.D., *ibid.*, p. 81; Upper Moesia (Viminacium) 239 A.D., *ibid.*, pp. 81–82.

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[1] E.g., false era of Actium at Orthosia, alleged by Seyrig, *Syria* 31, 1954, p. 76; False eras at Tripolis, *Syria* 27, 1950, pp. 38–42; Chalcis in Lebanon, *ibid.*, pp. 46–47; Epiphania of Syria, *ibid.*, pp. 25–26; at Hanisa, the date taken as a Pompeian era or an unknown city era is argued by Robert, *Noms Indigènes dans L'Asie Mineure*, Paris, 1963, pp. 479–481, as the date of a king; the false era of Alexandria Troas, cf. Robert, *Monnaies ant. de Troad*, 1966, p. 59, for which also see Bickerman, *Chronology* 1968, p. 74, treating as well Alexander's eras in Phoenicia, and the eras of Acco, Sidon, Aradus, and Tyre.

[2] In *RE* I, pp. 606–652, Kubitschek's article "Aera", supplemented by a short addition in *RE* Suppl. III, s.v. Aera. Lengthier discussions of some eras by Kubitschek appear in *Grundriß*, pp. 42ff., and local eras, pp. 67ff. Ginzel has sizable discussions of some of the eras which Kubitschek had treated in *RE*, and includes some not in Kubitschek. For references see indices to Ginzel I, II, III, s.v. Aera. Many Syrian and eastern eras are discussed by Seyrig in various numbers of Antiquites Syriennes in successive volumes of *Syria*, for which see notes above, and particularly *Syria* 27, 1950, pp. 5–56, as well as *Rev. Numismatique* Ser. 6, 6, 1964, pp. 51–67.

CHAPTER VIII

ROMAN CHRONOGRAPHY

A casual glance at the texts of Livy or Diodorus Siculus will suggest the validity of Bickerman's conclusion[1] that the Romans dated by consuls. The annalists, when choosing a system by which to designate Roman years, were forced to resort to a designation which was no more sophisticated than that which the Athenians had devised in constructing their archon list (cf. above, pp. 195 ff.). Although the Consular Fasti could be used in conjunction with other systems, as Diodorus used consular designations for years along with Athenian archons and Olympiads, and although a number of attempts were made to provide a uniform and agreed chronography separate from the consular lists, none of the other systems supplanted the fasti and the technical chronography failed, so that we are left like the Romans, with the fasti as the normal tool for the identification of individual years.

As Broughton has noted,[2] "the degree of agreement (on the list, by the sources) implies a single tradition." The Fasti Consulares compiled and published during the reign of Augustus probably froze the list for use by subsequent historians, but we can find in earlier sources such a high degree of agreement that we should probably explain any differences as due to individual and/or accidental variations from a known and established list.

The system, like that of the Athenian archon list, was cumbersome and inefficient. Although the Romans could have tied their chronography to Olympiads or to an early event like the fall of Troy (as many Hellenistic and later chronographers did) instead, they chose to try to create a system with an epoch that of the founding date of Rome. In a system of this sort, once the founding date had been satisfactorily pegged, subsequent years could be designated by a numeral "*ab urbe condita.*" A number of such systems were devised, but as Roman scholarship never reached a consensus in the founding date,[3] each of the systems was at variance with the others, so that there was no era *ab urbe condita* which could by consensus be used by all, and which by designating years with numerals only, could satisfy a desire for brevity and at the same time identify those years precisely and without reference either to consuls or to the deviser of the system. A number of such systems were commonly known, and some were used by chronographers. In the following sections I shall treat individually of the Fasti Consulares as well as of the more important of the systems with an epoch the founding of Rome.

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[1] *Chronology* 1968, pp. 69 and 77.

[2] T.R.S. Broughton, *The Magistrates of the Roman Republic*, Philological Monographs published by the American Philological Association, (Vol. I, 1951, Vol. II, 1952, Suppl. 1960 [Hereafter, *Mag. Rom. Rep.* I, II, Suppl.]) II, p. 637.

[3] Cf. Cicero, *Brutus* XVIII, 72, specifically mentions *inter scriptores ... controversia* with regard to the number of years between the foundation and an event dated by a set of consuls, and the disagreements seems also to be alluded to by Censorinus, *De die nat.* 21, 4, who goes on to congratulate Varro, to make possible precision in terms of days. Plutarch, *Romulus* 12, states that the date of the founding is agreed as April 21, following Varro, and reporting Varro's astrological source. Dion. Hal. I, 74,

1. *The Varronian System*

The Roman era about which we have the greatest number of references from antiquity is that devised by Terentius Varro, the prolific scholar of the first century B.C. The evidence permits considerable precision in our knowledge of what Varro did. According to Censorinus, by the Varronic reckoning, the epoch was 991 years before the consulship of 238 A.D., yielding 754 as the epoch date (991–238 = 753).[1] The founding of Rome was reported further by Censorinus as *ex Parilibus*,[2] a festival on April 21, a date which is confirmed by Plutarch[3] as the agreed anniversary of the foundation, indeed the day on which was seen an eclipse ascribed to Ol. 6, 3 (= 754/3 B.C.). This year, Ol.6, 3, had been selected for the epoch by Pomponius Atticus,[4] and he was followed in this by Cicero.[5]

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reports a number of historians with differing epochs: Timaios, 38 years before Ol. 1 (= 814 B.C.); Quintus Fabius, Ol. 8, 1 (= 748 B.C.): so also Solinus ed. Mommsen 1, 27, *Pictori octava*; Leucius Cincius, Ol. 12, 4 (= 729 B.C.) so Solinus, *ibid.*; Porcius Cato, 432 years after the fall of Troy, which Dion. deduces, from Eratosthenes, to be Ol. 7, 1 (= 752 B.C.); Polybius, Ol. 7, 2 (= 751 B.C.). Censorinus, *De die nat.* 17, 13 reports an epoch of Calpurnius Piso in terms of a consular reference point, while in 21, 4 ff. he works out the Varronic epoch. To use a system devised by any of these, it would have been necessary to know (or state) the author of the system, and the epoch with reference to some other system, like Olympiads, fall of Troy, or a consular date.

[1] *De die nat.* 21, 4–6. Censorinus reports that *Ulpii et Pontiani consulatus* was 991 *ab urbe condita* and that this year was 1014 of the Olympiad era (= Ol. 254, 2.) This evidence all works out if the foundation was in Ol. 6, 3, and the first year of the Varronic system was 753/2, i.e., the first year was counted as beginning in Ol. 6, 3, but made concurrent with 6, 4 for tabular purposes. Thus, the year 1, Varro = Ol. 6, 4, and the foundation year = Ol. 6, 3.

[2] *Op.cit.*

[3] *Romulus* 12. Plutarch's further comment that Tarutius, a contemporary of Varro, dated the founding to 9 Pharmouthi yields 4 April for Plutarch's time, but this is probably to be taken as the equivalent to 21 April at the time of Tarutius, before the Augustan reform which equated the Alexandrian year to the julian. Further confirmation of Varro's work on the foundation year comes from Arnobius, *Adversus nationes* V, 8.

[4] Solinus, ed. Mommsen, 1, 27, states that this was the year for both Atticus and Cicero.

[5] Cicero, *Brutus* XII, 72, places the consular year of 240 as the year before the birth of Ennius, and according to the reckoning which he follows (514 years after the foundation: 514 + 239 = 753) the epoch comes out to 753, and, since Cicero knows of the ascription to the Parilibus, *De. div.* II, 47, 98, it is clear that he has Ol. 6, 3 in mind as the epoch year as

Although this epoch was broadly known, it was not used, as I have said above, as a chronographic basis for history, except perhaps by its inventor Atticus or its popularizer Varro in his lost work. It should be noted that with the foundation set as 21 April, the user of this epoch normally set the foundation in Ol. 6, 3, so that year 1 ran from 21 April Ol.6, 3 (= 753) to 20 April Ol.6, 4 (= 752). Since many historians in later antiquity used Olympiad years as a basis for chronology, one often finds the 753 epoch crushed into concurrence with Olympiad, so that year 1 = Ol.6, 4, rather than as would be the proper portrayal, year = (Ol.6, 3 end – latter part of Ol.6, 4).

The 753 epoch (foundation date, Ol.6, 3) remained known through the late empire,[1] and although the following year became among many the favored one for the actual foundation[2] moderns again picked up the 753 date as a basis for the representation of years *ab urbe condita*. Thus, if a modern scholar indicates a year as XX *ab urbe condita*, he is saying that this is XX years from 753, with 21 April 753 – 20 April 752 as year 1 of the reckoning. This so-called Varronian era can only be used for an ancient author if the base date 753 can be established for that author.

2. *The Epoch of Ol. 6,4*

Dionysius of Halicarnassus, after giving a number of epochs in I, 74, proceeds through his own reasoning in chapter 75, to come to the conclusion: πᾶσα ἀνάγκη τὸν πρῶτον ἄρξαντα τῆς πόλεως Ῥωμύλον ἔτει πρώτῳ τῆς ἑβδόμης ὀλυμπιάδος τῆς δεκαετίας Χάροπας ἔτος πρῶτον. Dionysius is here making the Roman year, which should have begun with the Parilia on 21 April (see above, p. 250), concurrent with the Olympic year beginning in mid-summer, so that in fact, by making the first year be the Olympic year 7, 1 = 752/1, Dionysius is pointing to 21 April 752 (actually falling in Ol.6, 4) as the epoch. There is an apparent contradiction of the main Greek tradition in his making this year Ol.7, 1 the first year of Charops, but as we have seen above (p. 198), Dionysius' wording in I, 71, 5 reveals just what Dionysius is doing with the foundation date: κτίζουσι Ῥώμην ἔτους ἐνεστῶτος πρώτου τῆς ἑβδόμης ὀλυμπιάδος, ἣν ἐνίκα στάδιον Δαϊκλῆς Μεσσήνιος, ἄρχοντος Ἀθήνησι Χάροπος ἔτος τῆς δεκαετίας πρῶτον. Now, since Dionysius in his treatment of Athenian archons reveals (above, p. 199) that he follows the standard list, which put the first annual archon in Ol.24, 2 = 683/2 by that standard, the first year of the first ten-year archon, Charops, should have been 753/2 = Ol.6, 4, so that there is apparent contradiction in the collocation Charops 1 = Ol.7, 1. The difficulty comes from Diony-

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Solinus (note prior) alleges. In *Brutus* XIX, 74, Cicero reveals that it is Atticus whose calculations he is following.

[1] Eusebius (Jerome and Armenian) ed. Schoene, (Canones, pp. 80–81) has *nonnulli Romanorum scriptores Romam conditam ferunt* entered for Ol. 6, 3. Cf. the edition of Fotheringham, p. 153.

[2] Eusebius, *op.cit.* enters the foundation under Ol. 6, 4. This is, as we shall see, the foundation year for, *inter alia*, Dionysius of Halicarnassus and the Capitoline Fasti.

sius' attempt in the discussion of the founding of Rome to adjust Roman chronology to Greek, πῶς ἄν τις ἀπευθύνοι τοὺς Ῥωμαίων χρόνους πρὸς τοὺς Ἑλληνικούς, (I, 74, 2). If the first year of the era begins with 21 April 752, that year crosses both Ol.6, 4 (753/2) the first year of Charops, and Ol.7, 1 (752/1). I think that the equation Romulus 1 = Charops 1 in I, 75, 3 makes it clear that, for Dionysius, the Roman epoch is 21 April 752, and that Dionysius' other statements may be understood as consistent with that epoch, in an attempt to make it clear in terms of Greek chronography.[1]

The epoch of Ol.6, 4 was also used at the end of the first century B.C. by the composer of the Fasti Consulares et Triumphales Capitolini.[2] Era numbers are indicated every ten years in the lists of consuls and annually in the triumphal list in a consistent scheme which, when carried back from the later years when consular dates are known with certainty, shows the epoch to have been 752.

This epoch seems to have had the greatest acceptance in the empire. Evidence of practice of the chronographers of the early empire must be deduced from later sources, and in this regard, Eusebius is valuable. His version of the Canons of Jerome[3] is instructive. The text places the foundation of Rome in a. Abr. 1264 = Ol.6, 4, and the Armenian version agrees with this, but both texts acknowledge that *nonnulli... Romam conditam ferunt* in the preceding year. This makes it appear that Jerome was aware of both 753 and 752 epochs but chose the latter for his main entry. So too, the epoch of Ol.6, 4 seems to have served for Macrobius[4] and so far as we know, when an epoch date was desired for calculation after the beginning of the empire, this epoch was used at least as often, and perhaps more often than the 753 epoch, and certainly more than any other one. The coincidence of the Capitoline Fasti and the calculation of Dionysius makes it appear that for many, chronography had settled on this date at the end of the first century B.C., and the publication of the Fasti may have served to popularize it.

3. Other Epochs

As we have seen above (p. 249, note 3) a number of epochs are attested, from the very early Timaios epoch 38 years before Ol.1 (= 814 B.C.)[5] to as late as that of

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[1] See above, p. 198, where I argue that the use of ἐνεστῶτος reveals Dionysius' concern to show the concurrence of years.

[2] *Inscr. Ital.* XIII, Fasc. 1, Fasti Consulares et Triumphales, ed. Degrassi, Rome 1947.

[3] As the mss. reflected by A. Schoene, *Eusebi Chronicorum* II, *Chronicorum Canonum*, 1866, pp. 80–81. Fotheringham's edition of the Canons, Oxford 1923, suggests that the filae are less clear in the Latin.

[4] As may be constructed from, *inter alia*, *Sat.* I, 13, 20, which, giving an era number of 562 for M. Acilius Glabrio, shows the reckoning to be from an epoch of 752.

[5] Indeed, Ennius, as quoted by Varro, *De re rustica* III, 1, put the foundation about 700 years before his own time, i.e., ca. 875. B.C.

Leucius Cincius, Ol.12, 4 (= 729 B.C.) So far as I know only one of these survives in use in extant texts of extant historians to become a matter which must be taken into account by modern chronographers. The other epochs, although reported, have not so far as I know, been alleged as reckoning points, or even as influencing the chronographical reckoning, for any texts with which we may deal. The variants illustrated the proliferation of epochs but do not seem to have influenced Roman chronography in any significant measure.

The sole exception is the epoch of 751, Ol.7, 2. According to Dionysius,[1] Polybius used this epoch. Although this cannot be demonstrated from the extant text of Polybius, nothing in the text contradicts the statement, and Walbank, discussing the matter,[2] shows how it can be reconciled with evidence from Cicero, who seems at some points to use this epoch with Polybius as his source. Indeed, until the introduction of the 753 epoch, 751 stood for Cicero as it did for Livy and Diodorus,[3] and according to Solinus[4] it was also used by Cicero's contemporary Nepos, as well as by Lutatius, among Roman writers.[5] The epoch, although used by these historians, did not provide a basis for chronography, but instead Olympiads in the case of Polybius and Diodorus, or Athenian archons (Diodorus) or the consular fasti (Livy, Diodorus) provided the chronographic framework.

4. *The Consular Fasti*

As I have said at the beginning of this discussion, the normal method of indicating a year in Roman historiography, particularly for the republican period, was the naming of the consuls or their substitutes in office in that year. For the period of the kings,[6]

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[1] I, 74, 3.

[2] *Historical Commentary on Polybius* I, Oxford 1957, pp. 665–669, q.v. also for citation of scholarship on the subject.

[3] G. Perl, *Kritische Untersuchungen zu Diodors römischer Jahrzählung*, 1957, argues the case.

[4] Solinus 1, 27.

[5] Solinus further states that this was the epoch adopted by both Eratosthenes and Apollodorus.

[6] It hardly pays to attempt to give dates to the kings. The figures for the reigns vary individually, and absolute dates would depend upon the choice of epoch. It may be instructive, however, to compare Livy and Eusebius:

a. Abr.	Ol.	Eusebius King (1st year)	Reign length	Livy: length of reign
1265	7,1	Romulus	38	37
1303	16,3	Numa	41	43
1344	26,4	Tullus Hostilius	32	32
1376	34,4	Ancus Martius	23	24
1399	40,3	Tarquinius Priscus	37	38
1436	48,4	Servius	34	44
1470	58,2	Tarquinius Superbus	35	25

This brings Eusebius down to Ol. 67, 1 (= 512 B.C.) for the notation *Pulsis urbe regibus*, and the statement that the kings reigned for 240 years, *sive ut quibusdam placet* 244. Un-of course, these did not exist, but from the joint consulship of Iunius Brutus and L. Tarquinius the Fasti can account for every year of the republic. For chronographic purposes it is necessary to determine not who were the actual consuls, but rather, what name each year had in Roman chronography.

The concept of the naming of the year is precisely that discussed at greater length in connection with the Athenian archon list (q.v.). The sources, however, provide problems of method and data.

Although the sources generally reflect a unified tradition, there are enough differences among them in details of nomenclature, and in the early years, in either the order of some names or in the inclusion of numbers of dictator years, that the state of the official list at any one time is not always clear. Indeed, although it may be possible to deduce the position of a name on the list, confusions with regard to absolute chronology may create a situation in which the list position, while clear, would leave doubt about the date of a given name. Furthermore, there are some differences between the list as given by Livy and that of the Capitoline Fasti,[1] and Broughton[2] argued that Livy preserves the best record, while the Capitoline Fasti show a propaganda revision in some instances.[3]

Broughton's *Mag. Rom. Rep.* is an attempt to establish the historical and/or list positions of not only the consuls but also of other magistrates. The chronographer (modern or ancient) must rather know the names of the years without any regard for historicity. I shall, therefore, in the list of consuls, try to set forth the official list of the period before any revision reflected by the Capitoline Fasti, but will refer to Fasti variations. It should be remembered, however, that in all probability, for the period after the publication of the Fasti that list was the official one. In the subsequent tables, I will assign names to years B.C., using 753 as the epoch of the foundation of Rome, and 509 as the epoch of the beginning of the Republic. The structure of the tables indicates the name of each year in the official list, based on the 753/509 epochs, and I should like to emphasize that the issue at hand is the establishment of the sequence of names. I give no references where I see no serious *sequence* problem; full references may be found in Broughton, *Mag. Rom. Rep.*[4]

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der Ol. 67, 3 (= 510 B.C.), Eusebius also has the note *Romae post exactos reges primum consules a Bruto esse coeperunt.* This brings the inception of the consuls closer to what we normally expect for the beginning of the republic, and it is worth noting that the figure 244 given as the alternative is in fact the figure given by Livy, I, 60, for the length of the rule of the kings.

[1] To the main publication, A. Degrassi, *Inscr. Ital.* XIII, 1, *Fasti Consulares et Triumphales*, Rome, 1947, have been added new fragments, for which see G. Manganaro, "Iscrizioni latine e greche dal nuovo edificio termale di Taormina," *Cronache di Archeologia e di Storia dell' Arte* 3, 1964, pp. 38ff.

[2] *Mag. Rom. Rep.* I, xii.

[3] It is probably worth noting here that the cognomina as given either in the Fasti or in the literary sources do not themselves go back to the earliest period of the Republic, but were inserted into the list at some point in the development of the tradition. A. Alföldi, "Les *Cognomina* des Magistrats de la République romain," *Mélanges A. Piganiol*, 1966, pp. 709–722, suggests that, in the interest of exact identification of ancestors, that this was done only after the second Punic war, and that it antedated by a considerable time the use in other official documents. Such an explanation serves for the minor differences in the cognomina as shown in the sources.

[4] A list of consuls, 323–31 B.C., may be

For the imperial period, the names of the consuls (ordinary only) are based on A. Degrassi, *I Fasti Consolari dell' Impero Romano*, Rome, 1952, with corrections as noted. For the suffect consuls, the names of whom are not nearly settled enough for them to be listed here,[1] Degrassi should be consulted, as well as for the list after 398 A.D., as I terminate with the beginning of the assignment of one consul to the east and one to the west beginning in 399 A.D. It seems unlikely that there was ever any serious difference in antiquity about the names of consuls or about year designations, although defects in evidence preclude such comfortable knowledge today, particularly for the later period.

It is well to recognize, however, that despite the considerable researches by historians of the first century B.C. and after, the republican list was never quite settled, particularly in details of nomenclature. If the *Fasti Capitolini* and the tradition it founded differed in minor details from the traditions of Livy and others, the variations were never completely suppressed, and persist into the late sources to make it impossible to make final determinations in all cases of variance. There is no clear tradition which can be designated as 'Livy' except Livy himself, of course, and the same is true of the *Fasti*. In later sources, choices between contradictions in these two are resolved now one way, now another, and differences found in, e.g, Diodorus also persist. Withal, there is very little disagreement among the sources about the names of consuls in general, i.e., about the man meant, although there might often be divergence on his first name, for example, M'. or M., Ti. or T. Thus the list of consuls could be used as an effective means of designating years, and the technical disagreements among ancient or modern historians did not impede this use.

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found in E. Manni, *Fasti ellenistici e romani*, Suppl. *Kokalos* I, 1960, pp. 96–108. There is no sequence difference from Broughton, and, apart from a few names in which Manni follows the *Fasti Capitolini*, the major variation from Broughton is the order of the names of the consuls in a given year, where Manni in general accepts the order as given in the Fasti, with suppression of whole dictator years, so that his list is rather a reprinting of the inscription. For discussion of the order of the names, cf. T.R.S. Broughton, and L.R. Taylor, "The Order of the Two Consuls' Names in the Yearly Lists," *Memoirs of the American Academy in Rome* 19, 1949, pp. 3–14, and now *ibid.* "The Order of the Consuls' Names in Official Republican Lists," *Historia* 17, 1968, pp. 166–171.

[1] It seems to me that there is relatively little disagreement about the names of the *ordinarii* for the period here presented, while the names of many *suffecti* remain in doubt, and their listing here would make the list obsolete quickly. Degrassi, *Fasti Consolari* pp. 109–139, lists many names which cannot be placed with precision, so that the years which are not yet completed (not marked with asterisks by Degrassi) will see much revision. It may be worth listing some discussions of these matters which have appeared since Degrassi's publication.

A. Degrassi, "Sui Fasti Consolari dell' Impero," *Athenaeum* 33, 1955, pp. 112–117.

C.P. Jones, "A New Commentary on The Letters of Pliny (Review of A.N. Sherwin-White, *The Letters of Pliny*, 1966)," *Phoenix* 22, 1968, pp. 111–142.

H.J. Polotsky, "The Greek Papyri from The Cave of The Letters," *Israel Exploration Journal* 12, 1962, pp. 259–262.

R. Syme, Review of Degrassi, *Fasti Consolari dell' Impero Romano*, *JRS* 43, 1953, pp. 148–161. "The Consuls of A.D. 97: Addendum," *JRS* 44, 1954, pp. 81–82.

G.B. Townend, "The Consuls of A.D. 69/70," *Am. Journ. Philol.* 83, 1962, pp. 113–129.

S. Pancieras, "Ancora sui consoli dell' anno 13 o.c.", *Bull. Commiss. Arch. Comon. Roma.* 79, 1963–1964, pp. 94–98.

509	L. Iunius M. f. Brutus *Sp. Lucretius T.? f. Tricipitinus* *M. Horatius M. f. Pulvillus*	L. Tarquinius Egeri f. Collatinus consules suffecti *P. Valerius Volusi f. Publicola*
508	P. Valerius Volusi f. Poplicola II	T. Lucretius T. f. Tricipitinus
507	P. Valerius Volusi f. Poplicola III	M. Horatius M. f. Pulvillus II
506	Sp. Larcius Rufus (Flavus?)	T. Herminius -f. Aquilinius

These are named by, *inter alia*, Dion. Hal. V, 36, 1. Livy II, 15, 1 has been emended (Walters and Conway) to yield these, but it is clear from the text that another college was named: P. Lucretius and P. Valerius Poplicola. The latter can be referred to 507, conforming to the designation of his consulship (504) in Livy II, 16, 2, as *quartum*, but then Lucretius must be taken as an error for Larcius in that year, perhaps by confusion with Poplicola's colleague Lucretius in 508 and 504.

505	M. Valerius Volusi f. (Volusus?)	P. Postumius Q. f. Tubertus
504	P. Valerius Volusi f. Paplicola IV	T. Lucretius T. f. Tricipitinus II
503	Agrippa Menenius C. f. Lanatus	P. Postumius Q. f. Tubertus II
502	Opiter Verginius Opit. f. Tricostus	Sp. Cassius Vecellinus
501	Postum(i)us Cominius Auruncus	T. Larcius Flavus (Rufus?)
500	Ser. Sulpicius P. f. Camerinus	M'. Tullius Longus
499	T. Aebutius T. f. Helva	C. (P.?) Veturius -f. Geminus Cicurinus
498	Q. Cloelius Siculus	T. Larcius Flavus (Rufus?) II
497	A. Sempronius Atratinus	M. Minucius Augurinus
496	A. Postumius P. f. Albus (Regillensis)	T. Verginius A. f. Tricostus Caeliomontanus
495	Ap. Claudius M. f. Sabinus Inregillensis	P. Servilius P. f. Priscus Structus
494	A. Verginius A. f. Tricostus Caeliomontanus	T. Veturius Geminus Cicurinus
493	Postum(i)us Cominius Auruncus II	Sp. Cassius Vecellinus II
492	T. Geganius Macerinus	P. Minucius Augurinus
491	M. Minucius Augurinus II	A. Sempronius Atratinus II
490	Q. Sulpicius Camerinus Cornutus	Sp. Larcius Flavus (Rufus?) II
489	C. Iulius C. f. Iullus	P. Pinarius Mamertinus Rufus
488	Sp. Nautius Sp.? f. Rutilus	Sex. Furius Medullinus? Fusus?
487	T. Sicinius Sabinus:	C. Aquillius Tuscus?
486	Sp. Cassius -f. Vicellinus III	Proculus Verginius (Opet.? f. Opet. n.) Tricostus Rutilus
485	Ser. Cornelius Maluginensis	Q. Fabius K. f. Vibulanus
484	L. Aemilius Mam. f. Mamercus	K. Fabius K. f. Vibulanus
483	M. Fabius K. f. Vibulanus	L. Valerius M. f. Volusi n. Potitus
482	Q. Fabius K. f. Vibulanus II	C. Iulius C. f. L. n. Iullus
481	K. Fabius K. f. Vibulanus II	Sp. Furius Fusus
480	M. Fabius K. f. Vibulanus II	Cn. Manlius P. f. Cincinnatus
479	K. Fabius K. f. Vibulanus III	T. Verginius Opet. f. Opet. n. Tricostus Rutilus
478	L. Aemilius Mam. f. Mamercus II	C. Servilius Structus Ahala – – *Esquilinus* cos. suff.

Diod. Sic. XI, 52, 1, names C. Cornelius Lentulus as the colleague of Mamercus, which Broughton takes as an error. *Fasti Capit.* has Ahala.

477	C. (M.?) Horatius M. f. M. n. Pulvillus	T. Menenius Agrippae f. C. n. Lanatus
476	A. Verginius (Opet.? f. Opet. n.) Tricostus Rutilus	Sp. Servilius (P.? f.) Structus
475	P. Valerius P. f. Volusi n. Poplicola	C. Nautius Sp. f. Sp. n. Rutilus
474	L. Furius Medullinus	A. Manlius (Cn. f. P. n.) Vulso
473	L. Aemilius Mam. f. Mamercus III	Opet. Verginius (Opet. f.)

These are the names given by Livy II, 54, 3. Livy acknowledges the appearance of Vopiscus Iulius (C. f. L. n. Iullus) *vice* Verginius in some annals, and the latter is the tradition followed by Dion. Hal. IX, 37, 1 and *Fasti Capit.*; so also Diod. Sic. with the name Λεύκιος Στούδιος 'Ιοῦλλος in XI, 65, 1.

472	L. Pinarius Mamercinus Rufus	P. Furius Medullinus Fusus
471	Ap. Claudius Ap. f. M. n. Crassinus Inregillensis Sabinus	T. Quinctius (L. f. L. n) Capitolinus Barbatus
470	L. Valerius M. f. Volusi n. Potitus	Ti. Aemilius L. f. Mam. n. Mamercus
469	T. Numicius Priscus	A. Verginius Caeliomontanus
468	T. Quinctius (L. f. L. n.?) Capitolinus Barbatus II	Q. Servilius Structus Priscus
467	Ti. Aemilius L. f. Mam. n. Mamercus II	Q. Fabius M. f. K. n. Vibulanus
466	Q. Servilius Priscus	Sp. Postumius A. f. P. n. Albus Regillensis
465	Q. Fabius M. f. K. n. Vibulanus II	T. Quinctius (L. f. L. n.?) Capitolinus Barbatus III
464	A. Postumius A. f. P. n. Albus Regillensis	Sp. Furius Medullinus Fusus
463	P. Servilius Sp. f. P. n. Priscus	L. Aebutius T. f. T. n. Helva
462	L. Lucretius T. f. T. n. Tricipitinus	T. Veturius T. f. Geminus Cicurinus
461	P. Volumnius M. f. M. n. Amintinus Gallus	Ser. Sulpicius Ser. n. Camerinus Cornutus
460	P. Valerius P. f. Volusi Poplicola II *L. Quinctius L. f. L. n. Cincinnatus* suff.	C. Claudius Ap. f. M. n. (Crassus?) Inrigillensis Sabinus
459	Q. Fabius M. f. K. n. Vibulanus III	L. Cornelius Ser. f. P. n. Maluginensis Uritinus
458	C. Nautius Sp. f. Sp. n. Rutilus II	L. Minucius P. f. M. n. Esquilinus Augurinus

Minucius is the ordinary consul in Livy III, 25, 1; Diod. Sic. XI, 88, 1, etc., but is listed as suffect in *Fasti Capit.*, replacing ------ Carve[tus?] or Carve[nt(anus) cf. J. Svolahti, *Arctos* 3, 1962, pp. 215–228; Ogilvie, *Hermes* 89, 1961, pp. 379–382, proposed [M. Papirius -f.-] n. Carven[tanus]

457	C. (M.?) Horatius M. f. M. n. Pulvillus II	Q. Minucius P. f. M. n. Esquilinus

Diod. Sic. XI, 91, 1, gives one L. Postumius as the colleague of Horatius, but L. Postumius is not otherwise attested for this period.

Between the names above and below, Diod. Sic. XII, 3, 1, gives the college of:

	L. Quinctius L. f. L. n. Cincinnatus	M. Fabius Vibulanus
456	M. Valerius M'. f. Volusi n. Maxumus Lactuca	Sp. Verginius A. f. A. n. Tricostus Caeliomontanus
455	T. Romilius T. f. T. n. Rocus Vaticanus	C. Veturius P. f. Cicurinus
454	Sp. Tarpeius M. f. M. n. Montanus Capitolinus	A. Aeternius Varus Fontinalis
453	Sex. Quinctilius Sex. f. P. n. *Sp. Furius (Medullinus Fusus?)* suff.	P. Curiatius Fistus Trigeminus
452	T. Menenius Agripp. f. Agripp. n. Lanatus	P. Sestius Q. f. Vibi n. Capito(linus?) Vaticanus
451	Ap. Claudius Ap. f. M. n. Crassus Inrigillensis Sabinus II	T. Genucius L. f. L. n. Augurinus

Listed as consuls in *Fasti Capit.*, and then placed at head of the board of decemviri. In other sources, listed as consuls-elect, then placed at head of decemviri.

450	*Decemviri Consulari Imperio Legibus Scribendis*	
449	L. Valerius P. f. P. n. Potitus	M. Horatius M. f. L. (P.?) n. .. rrin Barbatus
448	Lars (Sp.?) Herminius Coritinesanus	T. Verginius Tricostus Caeliomontanus
447	M. Geganius M. f. Macerinus	C. Iulius (Iullus?)
446	T. Quinctius (L. f. L. n.) Capitolinus Barbatus IV	Agrippa Furius Fusus
445	M. Genucius Augurinus	C. (Agripp.?) Curtius Philo (Chilo?)
444	*Tribuni militum consulari potestate* resigned after 3 months, and interrex created suffect.:	
	L. Papirius Mugillanus	*L. Sempronius (A. f.) Atratinus*

Livy IV, 7, 10 notes that these names omitted by early annalists and magistrate lists

443	M. Geganius M. f. Macerinus II	T. Quinctius L. f. L. n. Capitolinus Barbatus V
442	M. Fabius (Q. f. M. n.) Vibulanus	Post. Aebutius Helva Cornicen

441	C. Furius Pacilus Fusus	M'. (M.?) Papirius Crassus
440	Proculus Geganius Macerinus	L. Menenius Agripp. f. Agripp. n. Lanatus as Livy IV, 12, 6, but in Diod. Sic. with praen. Titus (XII, 36, 1) and designated as Lanatus II in Chr. 354 and would thus be the consul of 452
439	Agrippa Menenius T. f. Agripp. n. Lanatus	T. Quinctius L. f. L. n. Capitolinus Barbatus VI
438	*Tribuni militum consulari potestate*	
437	M. Geganius M. f. Macerinus III	L. Sergius C. f. C. n. Fidenas
436	L. Papirius Crassus	M. Cornelius (M. f. L. n.) Maluginensis
435	C. Iulius (Iullus?) II	L. (Proc.?) Virginius Tricostus
434	C. Iulius (Iullus?) III	L. (Proc.?) Virginius Tricostus

are listed as repeated in this year by Livy IV, 23, 1–3, based on testimony of Licinius Macer. Livy acknowledges that Valerius Antias and Tubero both report M. Manlius (Capitolinus) and Q. Sulpicius (Camerinus Praetextus) as consuls for the year, and Diod. Sic. XII, 53, 1 reports the latter two among the three *trib.mil. cons.pot.* for the year.

433	*Tribuni militum consulari potestate*	
432	*Tribuni militum consulari potestate*	
431	T. Quinctius L. f. L. n. Poenus Cincinnatus	C. (Cn.?) Iulius Mento
430	L. (C.?) Papirius Crassus II?	L. Iulius (Vop. f. C. n.?) Iullus
429	Hostus Lucretius Tricipitinus	L. Sergius C. f. C. n. Fidenas II
428	A. Cornelius M. f. L. n. Cossus	T. Quinctius L. f. L. n. Poenus Cincinnatus II

Between the colleges above and below, Diod. Sic. XII, 77, 1, lists the names of

	L. Quinctius (L. f. L. n. Cincinnatus)	A. Sempronius (L. f. A. n. Atratinus)
427	C. Servilius Structus Ahala	L. Papirius (L. f.) Mugillanus
426	*Tribuni militum consulari potestate*	
425	*Tribuni militum consulari potestate*	
424	*Tribuni militum consulari potestate*	
423	C. Sempronius Atratinus	Q. Fabius Q. f. M. n. Vibulanus
422	*Tribuni militum consulari potestate*	
421	Cn. (N.?) Fabius Q. f. M. n. Vibulanus	T. Quinctius T. f. L. n. Capitolinus Barbatus
420	*Tribuni militum consulari potestate*	
419	*Tribuni militum consulari potestate*	
418	*Tribuni militum consulari potestate*	
417	*Tribuni militum consulari potestate*	
416	*Tribuni militum consulari potestate*	
415	*Tribuni militum consulari potestate*	
414	*Tribuni militum consulari potestate*	
413	A. (M.?) Cornelius Cossus	L. Furius (L. f. Sp. n.?) Medullinus
412	Q. Fabius Ambustus Vibulanus	C. Furius Pacilus
411	M. Papirius L. f. Mugillanus (Atratinus?)	Sp. (C.?) Nautius Sp. f. Sp. n. Rutilus
410	M'. (M.?) Aemilius Mam. f. M. n. Mamercinus	C. Valerius (L. f. Vol. n.) Potitus Volusus
409	Cn. Cornelius A. f. M. n. Cossus	L. Furius (L. f. Sp. n.?) Medullinus II
408	*Tribuni militum consulari potestate*	
407	*Tribuni militum consulari potestate*	
406	*Tribuni militum consulari potestate*	
405	*Tribuni militum consulari potestate*	
404	*Tribuni militum consulari potestate*	
403	*Tribuni militum consulari potestate*	
402	*Tribuni militum consulari potestate*	
401	*Tribuni militum consulari potestate*	
400	*Tribuni militum consulari potestate*	
399	*Tribuni militum consulari potestate*	

398	*Tribuni militum consulari potestate*	
397	*Tribuni militum consulari potestate*	
396	*Tribuni militum consulari potestate*	
395	*Tribuni militum consulari potestate*	
394	*Tribuni militum consulari potestate*	
393	L. Lucretius Tricipitinus Flavus	Ser. Sulpicius Q. f. Ser. n. Camerinus
	are the regular consuls, according to Livy, V, 29, 2, but in *Fasti Capit.* this college follows upon another for the year, and the inscription has been restored to make these the *cons. suff.*, with the regular consuls for the year:	
	L. Valerius L. f. P. n. Potitus	P.? (Ser.) Cornelius Maluginensis
392	L. Valerius L. f. P. n. Potitus II	M. Manlius T. f. A. n. Capitolinus
	According to Livy V, 31, 7–8 and 32, 1, the consuls abdicated early in the year, and were followed by military tribunes	
391		
/	*Tribuni militum consulari potestate*	
376	⋮	
375		
/	No curule magistrates elected for these years	
371		
370		
/	*Tribuni militum consulari potestate*	
367		
366	L. Aemilius L. f. Mam. n. Mamercinus (Mamercus?)	L. Sextius Sex. f. N. n. Sextinus Lateranus
365	L. Genucius M. f. Cn. n. Aventinensis	Q. Servilius Q. f. Q. n. Ahala
364	C. Sulpicius M. f. Q. n. Peticus	C. Licinius C. f. P. n. Stolo *Fasti Capit.* has Stolo in 361, Calvus in 364
363	Cn. Genucius M. f. M. n. Aventinus	L. Aemilius L. f. Mam. n. Mamercinus (Mamercus?) II
362	Q. Servilius Q. f. Q. n. Ahala II	L. Genucius M. f. Cn. n. Aventinensis II
361	C. Licinius C. f. P. n. Calvus Stolo in *Fasti Capit.*	C. Sulpicius M. f. Q. n. Peticus II
360	M. Fabius N. f. M. n. Ambustus	C. Poetelius C. f. Q. n. Libo Balbus (Visolus *Fasti Capit.*)
359	M. Popillius M. f. C. n. Laenas	Cn. Manlius L. f. A. n. Capitolinus Imperiosus
358	C. Fabius N. f. M. n. Ambustus	C. Plautius P. f. P. n. Proculus
357	C. Marcius L. f. C. n. Rutilus	Cn. Manlius L. f. A. n. Capitolinus Imperiosus II
356	M. Fabius N. f. M. n. Ambustus II	M. Popillius M. f. C. n. Laenas II
355	C. Sulpicius M. f. Q. n. Peticus III	M. Valerius L. f. Poplicola
354	M. Fabius N. f. M. n. Ambustus III	T. Quinctius (Poenus Capitolinus Crispinus) Livy VII, 18, 10, reports that some annals have M. Popillius (Laenas) in place of Quinctius; *Fasti Triump. Capit.* list Laenas' III in 350.
353	C. Sulpicius M. f. Q. n. Peticus IV	M. Valerius L. f. L. n. Poplicola II
352	P. Valerius P. f. L. n. Poplicola	C. Marcius L. f. C. n. Rutilus II
351	C. Sulpicius M. f. Q. n. Peticus V	T. Quinctius Poenus Capitolinus Crispinus II
350	M. Popillius M. f. C. n. Laenas III	L. Cornelius P. f. Scipio
349	L. Furius M. f. L. n. Camillus	Ap. Claudius P. f. Ap. n. Crassus Inregillensis
	But Diod. Sic. XVI, 59, 1, has in this position in the list the names	
	M. Aemilius	T. Quinctius
348	M. Valerius M. f. M. n. Corvus	M. Popillius M. f. C. n. Laenas IV

347	C. Plautius Venno (Venox?)	T. Manlius L. f. A. n. Imperiosus Torquatus
346	M. Valerius M. f. M. n. Corvus II	C. Poetelius C. f. Q. n. Libo Visolus II
345	M. Fabius Dorsuo	Ser. Sulpicius Camerinus Rufus
344	C. Marcius L. f. C. n. Rutilus III	T. Manlius L. f. A. n. Imperiosus Torquatus II
343	M. Valerius M. f. M. n. Corvus III	A. Cornelius P. f. A. n. Cossus Arvina
342	Q. Servilius Q. f. Q. n. Ahala III	C. Marcius L. f. C. n. Rutilus IV
341	C. Plautius Venno (Venox?) II	L. Aemilius L. f. L. n. Mamercinus Privernas It may be worth noting that the name in Livy VIII, 1, 1 is T. Aemilius Mamercus in the mss.
340	T. Manlius L. f. A. n. Imperiosus Torquatus III	P. Decius Q. f. Mus
339	Ti. Aemilius Mamercinus	Q. Publilius Q. f. Q. n. Philo
338	L. Furius Sp. f. M. n. Camillus	C. Maenius P. f. P. n.
337	C. Sulpicius Ser. f. Q. n. Longus	P. Aelius Paetus
336	L. Papirius L. f. L. n. Crassus	K. Duillius (Diod. Sic. XVII, 29, 1: Caeso Valerius)
335	M. Atilius Regulus Calenus	M. Valerius M. f. M. n. Corvus IV
334	Sp. Postumius Albinus (Caudinus)	T. Veturius Calvinus
333	Dictator year	
332	Cn. Domitius Cn. f. Calvinus	A. Cornelius P. f. A. n. Cossus Arvina II
331	C. Valerius L. f. L. n. Potitus	M. Claudius C. f. C. n. Marcellus
330	L. Papirius L. f. L. n. Crassus II	L. Plautius L. f. L. n. Venno (Venox?)
329	L. Aemilius L. f. L. n. Mamercinus Privernas II	C. Plautius P. f. P. n. Decianus
328	P. Plautius Proculus	P. Cornelius Scapula
	are the consuls of Livy IX, 22, 1. But the sources also admit of the Plautius consul of 329, or even the Plautius Venno-Venox, and similarly, the Cornelius may be Scipio Barbatus and not Scapula; Diod. Sic. XVII, 87, 1 has P. Cornelius and A. Postumius.	
327	L. Cornelius Lentulus	Q. Publilius Q. f. Q. n. Philo
326	C. Poetelius C. f. Q. n. Libo Visolus III	L. Papirius Sp. f. L. n. Mugillanus: *sic* Livy VIII, 23, 17, noting that Cursor is found in other annals; Cursor is the choice of, *inter alia, Fasti Triumph. Capit.* in his dictator year of 325. Cf. Livy IX, 15, 11.
325	L. Furius Sp. f. M. n. Camillus II	D. Iunius Brutus Scaeva
324	Dictator year	
323	C. Sulpicius Ser. f. Q. n. Longus II	Q. Aulius Q. f. Q. n. Cerretanus: Livy VIII, 37, 2, has Q. Aemilius, acknowledging Aulius in some annals, and in IX, 15, 11, in treating of a second consulship of Q. Aulius Cerretanus, seems to support this choice.
322	Q. Fabius M. f. N. n. Maximus Rullianus	L. Fulvius L. f. L. n. Curvus
321	T. Veturius Calvinus II	Sp. Postumius Albinus (Caudinus) II
320	L. Papirius Sp. f. L. n. Cursor II	Q. Publilius Q. f. Q. n. Philo III
319	L. Papirius Sp. f. L. n. Cursor III Livy IX, 15, 11, again reports a version with L. Papirius Mugillanus *vice* Cursor.	Q. Aulius Q. f. Q. n. Cerretanus II
318	M. Folius C. f. M. n. Flaccinator	L. Plautius L. f. L. n. Venno (Venox?)
317	C. Iunius C. f. C. n. Bubulcus Brutus	Q. Aemilius Q. f. L. n. Barbula
316	Sp. Nautius Sp. f. Sp. n. Rutilus	M. Popillius M. f. M. n. Laenas
315	L. Papirius Sp. f. L. n. Cursor IV	Q. Publilius Q. f. Q. n. Philo IV
314	M. Poetelius M. f. M. n. Libo	C. Sulpicius Ser. f. Q. n. Longus
313	L. Papirius Sp. f. L. n. Cursor V	C. Iunius C. f. C. n. Bubulcus Brutus II

312	M. Valerius M. f. M. n. Maximus (Corvinus)	P. Decius P. f. Q. n. Mus
311	C. Iunius C. f. C. n. Bubulcus Brutus III	Q. Aemilius Q. f. L. n. Barbula II
310	Q. Fabius M. f. N. n. Maximus Rullianus II	C. Marcius C. f. L. n. Rutilus (Censorinus)
309	Dictator year	
308	P. Decius P. f. Q. n. Mus II	Q. Fabius M. f. N. n. Maximus Rullianus III
307	Ap. Claudius C. f. Ap. n. Caecus	L. Volumnius C. f. C. n. Flamma Violens
306	Q. Marcius Q. f. Q. n. Tremulus	P. Cornelius A. f. P. n. Arvina
305	L. Postumius L. f. Sp. n. Megellus	Ti. Minucius Augurinus *M. Fulvius L. f. L. n. Curvus Paetinus* suff.
304	P. Sempronius P. f. C. n. Sophus	P. Sulpicius Ser. f. P. n. Saverrio
303	Ser. Cornelius Cn. f. Cn. n. Lentulus	L. Genucius Aventinensis
302	M. Livius C. n. Denter	M. Aemilius L. f. L. n. Paullus
301	Dictator year	
300	M. Valerius M. f. M. n. Maximus Corvus V	Q. Appuleius Pansa
299	M. Fulvius Cn. f. Cn. n. Paetinus (Livy X, 9, 9: Paetus)	T. Manlius (T. f. T. n.) Torquatus *M. Valerius M. f. M. n. Maximus Corvus* VI suff.
298	L. Cornelius Cn. f. Scipio Barbatus	Cn. Fulvius Cn. f. Cn. n. Maximus Centumalus
297	Q. Fabius M. f. N. n. Maximus Rullianus IV	P. Decius P. f. Q. n. Mus III
296	L. Volumnius C. f. C. n. Flamma Violens II	Ap. Claudius C. f. Ap. n. Caecus II
295	Q. Fabius M. f. N. n. Maximus Rullianus V	P. Decius P. f. Q. n. Mus IV
294	L. Postumius L. f. Sp. n. Megellus II	M. Atilius M. f. M. n. Regulus
293	L. Papirius L. f. Sp. n. Cursor	Sp. Carvilius C. f. C. n. Maximus
292	Q. Fabius Q. f. M. n. Maximus Gurges	D. Iunius D. f. Brutus Scaeva
291	L. Postumius L. f. Sp. n. Megellus III	C. Iunius C. f. C. n. Bubulcus Brutus
290	P. Cornelius Cn. f. P. n. Rufinus	M'. Curius M'. f. M'. n. Dentatus
289	M. Valerius M. f. M. n. Maximus Corvinus II	Q. Caedicius Q. f. Noctua
288	Q. Marcius Q. f. Q. n. Tremulus II	P. Cornelius A. f. P. n. Arvina II
287	M. Claudius (M. f. C. n.) Marcellus	C. Nautius Rutilus
286	M. Valerius Maximus (Potitus?)	C. Aelius Paetus
285	C. Claudius M. f. C. n. Canina	M. Aemilius Lepidus
284	C. Servilius Tucca	L. Caecilius Metellus Denter
283	P. Cornelius Dolabella	Cn. Domitius Cn. f. Cn. n. Calvinus Maximus
282	C. Fabricius C. f. C. n. Luscinus	Q. Aemilius Cn. f. L. n. Papus
281	L. Aemilius Q. f. Q. n. Barbula	Q. Marcius Q. f. Q. n. Philippus
280	P. Valerius Laevinus	Ti. Coruncanius Ti. f. Ti. n.
279	P. Sulpicius P. f. Ser. n. Saverrio	P. Decius P. f. P. n. Mus
278	C. Fabricius C. f. C. n. Luscinus II	Q. Aemilius Cn. f. L. n. Papus II
277	P. Cornelius Cn. f. P. n. Rufinus II	C. Iunius C. f. C. n. Bubulcus Brutus II
276	Q. Fabius Q. f. M. n. Maximus Gurges II	C. Genucius L. f. L. n. Clepsina
275	M'. Curius M'. f. M'. n. Dentatus II	L. Cornelius Ti. f. Ser. n. Lentulus Caudinus
274	M'. Curius M'. f. M'. n. Dentatus III	Ser. Cornelius P. f. Ser. n. Merenda
273	C. Fabius M. f. M. n. Licinus	C. Claudius M. f. C. n. Canina
272	L. Papirius L. f. Sp. n. Cursor II	Sp. Carvilius C. f. C. n. Maximus II
271	K. Quinctius L. f. Cn. n. Claudus	L. Genucius L. f. L. n. Clepsina
270	C. Genucius L. f. L. n. Clepsina II	Cn. Cornelius P. f. Cn. n. Blasio
269	Q. Ogulnius L. f. A. n. Gallus	C. Fabius C. f. M. n. Pictor
268	P. Sempronius P. f. P. n. Sophus	Ap. Claudius Ap. f. C. n. Russus
267	M. Atilius M. f. L. n. Regulus	L. Iulius L. f. L. n. Libo
266	D. Iunius D. f. D. n. Pera	N. Fabius C. f. M. n. Pictor
265	Q. Fabius Q. f. Q. n. Maximus Gurges ???*Decius Mus* suff.	L. Mamilius (Q. f. M. n.?) Vitulus

264	Ap. Claudius C. f. Ap. n. Caudex	M. (Q.?) Fulvius Q. f. M. n. Flaccus
263	M'. Valerius M. f. M. n. Maximus Messala	M'. Otacilius C. f. M'. n. Crassus
262	L. Postumius L. f. L. n. Megellus	Q. Mamilius Q. f. M. n. Vitulus
261	L. Valerius M. f. L. n. Flaccus	T. Otacilius C. f. M.' n. Crassus
260	Cn. Cornelius L. f. Cn. n. Scipio Asina	C. Duilius M. f. M. n.
259	L. Cornelius L. f. Cn. n. Scipio	C. Aquillius M. f. C. n. Florus
258	A. Atilius A. f. C. n. Caiatinus	C. Sulpicius Q. f. Q. n. Paterculus
257	C. Atilius M. f. M. n. Regulus	Cn. Cornelius P. f. Cn. n. Blasio II
256	L. Manlius A. f. P. n. Vulso Longus	Q. Caedicius Q. f. Q. n.
		M. Atilius M. f. L. n. Regulus II suff.
255	Ser. Fulvius M. f. M. n. Paetinus Nobilior	M. Aemilius M. f. L. n. Paullus
254	Cn. Cornelius L. f. Cn. n. Scipio Asina II	A. Atilius A. f. C. n. Caiatinus II
253	Cn. Servilius Cn. f. Cn. n. Caepio	C. Sempronius Ti. f. Ti. n. Blaesus
252	C. Aurelius L. f. C. n. Cotta	P. Servilius Q. f. Cn. n. Geminus
251	L. Caecilius L. f. C. n. Metellus	C. Furius C. f. C. n. Pacilus
250	C. Atilius M. f. M. n. Regulus II	L. Manlius A. f. P. n. Vulso (Longus)
249	P. Claudius Ap. f. C. n. Pulcher	L. Iunius C. f. L. n. Pullus
248	C. Aurelius L. f. C. n. Cotta II	P. Servilius Q. f. Cn. n. Geminus II
247	L. Caecilius L. f. C. n. Metellus II	N. Fabius M. f. M. n. Buteo
246	M. Otacilius C. f. M'. n. Crassus II	M. Fabius C. f. M. n. Licinus
245	M. Fabius M. f. M. n. Buteo	C. Atilius A. f. A. n. Bulbus
244	A. Manlius T. f. T. n. Torquatus Atticus	C. Sempronius Ti. f. Ti. n. Blaesus
243	C. Fundanius C. f. Q. n. Fundulus	C. Sulpicius C. f. Ser. n. Galus
242	C. Lutatius C. f. C. n. Catulus	A. Postumius A. f. L. n. Albinus
241	A. Manlius T. f. T. n. Torquatus Atticus II	Q. Lutatius C. f. C. n. Cerco
240	C. Claudius Ap. f. C. n. Centho	M. Sempronius C. f. M. Tuditanus
239	C. Mamilius Q. f. Q. n. Turrinus	Q. Valerius Q. f. P. n. Falto
238	Ti. Sempronius Ti. f. C. n. Gracchus	P. Valerius Q. f. P. n. Falto
237	L. Cornelius L. f. Ti. n. Lentulus Caudinus	Q. Fulvius M. f. Q. n. Flaccus
236	P. Cornelius L. f. Ti. n. Lentulus Caudinus	C. Licinius P. f. P. n. Varus
235	T. Manlius T. f. T. n. Torquatus	C. Atilius A. f. A. n. Bulbus II
234	L. Postumius A. f. A. n. Albinus	Sp. Carvilius Sp. f. C. n. Maximus (Ruga)
233	Q. Fabius Q. f. Q. n. Maximus Verrucosus	M'. Pomponius M'. f. M'. n. Matho
232	M. Aemilius M. f. M. n. Lepidus	M. Publicius L. f. L. n. Malleolus
231	M. Pomponius M'. f. M'. n. Matho	C. Papirius C. f. L. n. Maso
230	M. Aemilius L. f. Q. n. Barbula	M. Iunius D. f. D. n. Pera
229	L. Postumius A. f. A. n. Albinus II	Cn. Fulbius Cn. f. Cn. n. Centumalus
228	Sp. Carvilius Sp. f. C. n. Maximus (Ruga) II	Q. Fabius Q. f. Q. n. Maximus Verrucosus II
227	P. Valerius L. f. M. n. Flaccus	M. Atilius M. f. M. n. Regulus
226	M. Valerius M'. f. M. n. (Maximus) Messalla	L. Apustius L. f. C. n. Fullo
225	L. Aemilius Q. f. Cn. n. Papus	C. Atilius M. f. M. n. Regulus
224	T. Manlius T. f. T. n. Torquatus II	Q. Fulvius M. f. Q. n. Flaccus II
223	C. Flaminius C. f. L. n.	P. Furius Sp. f. M. n. Philus
222	M. Claudius M. f. M. n. Marcellus	Cn. Cornelius L. f. L. n. Scipio Calvus
221	P. Cornelius (Cn. f. L. n.) Scipio Asina	M. Minucius C. f. C. n. Rufus

Livy, XXIII, 30, 15, mentions that *M. Aemilius Lepidus* was honored in 215 B.C., and that he had been consul twice. It may be that he is to be placed as suffectus in this year, 221.

220	M. Valerius P. f. P. n. Laevinus	Q. Mucius P. f. Scaevola
219	L. Aemilius M. f. M. n. Paullus	M. Livius M. f. M. n. Salinator
218	P. Cornelius L. f. L. n. Scipio	Ti. Sempronius C. f. C. n. Longus
217	Cn. Servilius P. f. Q. n. Geminus	C. Flaminius C. f. L. n. II
		M. Atilius M. f. M. n. Regulus II suff.
216	C. Terentius C. f. M. n. Varro	L. Aemilius M. f. M. n. Paullus
215	L. Postumius A. f. A. n. Albinus III	Ti. Sempronius Ti. f. Ti. n. Gracchus
	M. Claudius M. f. M. n. Marcellus II suff.	
	Q. Fabius Q. f. Q. n. Maximus (Verrucosus) III suff.	

214	Q. Fabius Q. f. Q. n. Maximus Verrucosus IV	M. Claudius M. f. M. n. Marcellus III
213	Q. Fabius Q. f. Q. n. Maximus	Ti. Sempronius Ti. f. Ti. n. Gracchus II
212	Q. Fulvius M. f. Q. n. Flaccus III	Ap. Claudius P. f. Ap. n. Pulcher
211	Cn. Fulvius Cn. f. Cn. n. Centumalus Maximus	P. Sulpicius Ser. f. P. n. Galba Maximus
210	M. Claudius M. f. M. n. Marcellus IV	M. Valerius P. f. P. n. Laevinus II
209	Q. Fabius Q. f. Q. n. Maximus Verrucosus V	Q. Fulvius M. f. Q. n. Flaccus IV
208	M. Claudius M. f. M. n. Marcellus V	T. Quinctius L. f. L. n. Crispinus
207	C. Claudius Ti. f. Ti. n. Nero	M. Livius M. f. M. n. Salinator II
206	L. Veturius L. f. L. n. Philo	Q. Caecilius L. f. L. n. Metellus
205	P. Cornelius P. f. L. n. Scipio (Africanus)	P. Licinius P. f. P. n. Crassus Dives
204	M. Cornelius M. f. M. n. Cethegus	P. Sempronius C. f. C. n. Tuditanus
203	Cn. Servilius Cn. f. Cn. n. Caepio	C. Servilius C. f. P. n. Geminus
202	M. Servilius C. f. P. n. Pulex Geminus	Ti. Claudius P. f. Ti. n. Nero
201	Cn. Cornelius L. f. L. n. Lentulus	P. Aelius Q. f. P. n. Paetus
200	P. Sulpicius Ser. f. P. n. Galba Maximus II	C. Aurelius C. f. C. n. Cotta
199	L. Cornelius L. f. L. n. Lentulus	P. Villius Ti. f. Ti. n. Tappulus
198	Sex. Aelius Q. f. P. n. Paetus Catus	T. Quinctius T. f. L. n. Flamininus
197	C. Cornelius L. f. M. n. Cethegus	Q. Minucius C. f. C. n. Rufus
196	L. Furius Sp. f. Sp. n. Purpurio	M. Claudius M. f. M. n. Marcellus
195	L. Valerius P. f. L. n. Flaccus	M. Porcius M. f. Cato
194	P. Cornelius P. f. L. n. Scipio Africanus II	Ti. Sempronius Ti. f. C. n. Longus
193	L. Cornelius L. f. Merula	Q. Minucius Q. f. L. n. Thermus
192	L. Quinctius T. f. L. n. Flamininus	Cn. Domitius L. f. L. n. Ahenobarbus
191	P. Cornelius Cn. f. L. n. Scipio Nasica	M'. Acilius C. f. L. n. Glabrio
190	L. Cornelius P. f. L. n. Scipio Asiaticus	C. Laelius C. f. C. n.
189	M. Fulvius M. f. Ser. n. Nobilior	Cn. Manlius Cn. f. L. n. Vulso
188	M. Valerius M. f. M'. n. Messalla	C. Livius M. f. M. n. Salinator
187	M. Aemilius M. f. M. n. Lepidus	C. Flaminius C. f. C. n.
186	Sp. Postumius L. f. A. n. Albinus	Q. Marcius L. f. Q. n. Philippus
185	Ap. Claudius Ap. f. P. n. Pulcher	M. Sempronius M. f. C. n. Tuditanus
184	P. Claudius Ap. f. P. n. Pulcher	L. Porcius L. f. M. n. Licinus
183	M. Claudius M. f. M. n. Marcellus	Q. Fabius Q. f. Q. n. Labeo
182	Cn. Baebius Q. f. Cn. n. Tamphilus	L. Aemilius L. f. M. n. Paullus
181	P. Cornelius L. f. P. n. Cethegus	M. Baebius Q. f. Cn. n. Tamphilus
180	A. Postumius A. f. A. n. Albinus (Longus) Q. *Fulvius Cn. f. M. n. Flaccus* suff.	C. Calpurnius C. f. C. n. Piso
179	Q. Fulvius Q. f. M. n. Flaccus	L. Manlius L. f. L. n. Acidinus Fulvianus
178	M. Iunius M. f. L. n. Brutus	A. Manlius Cn. f. L. n. Vulso
177	C. Claudius Ap. f. P. n. Pulcher	Ti. Sempronius P. f. Ti. n. Gracchus
176	Cn. Cornelius Cn. f. L. n. Scipio Hispallus *C. Valerius M. f. P. n. Laevinus* suff.	Q. Petillius C. f. Q. n. Spurinus
175	P. Mucius Q. f. P. n. Scaevola	M. Aemilius M. f. M. n. Lepidus II
174	Sp. Postumius A. f. A. n. Albinus Paullulus	Q. Mucius P. f. P. n. Scaevola
173	L. Postumius A. f. A. n. Albinus	M. Popillius P. f. P. n. Laenas
172	C. Popillius P. f. P. n. Laenas	P. Aelius P. f. P. n. Ligus
171	P. Licinius C. f. P. n. Crassus	C. Cassius C. f. C. n. Longinus
170	A. Hostilius L. f. A. n. Mancinus	A. Atilius C. f. C. n. Serranus
169	Q. Marcius L. f. Q. n. Philippus II	Cn. Servatus Cn. f. Cn. n. Caepio
168	L. Aemilius L. f. L. n. Paullus	C. Licinius C. f. P. n. Crassus
167	Q. Aelius P. f. Q. n. Paetus	M. Iunius M. f. M. n. Pennus
166	M. Claudius M. f. M. n. Marcellus	C. Sulpicius C. f. C. n. Galus
165	T. Manlius A. f. T. n. Torquatus	Cn. Octavius Cn. f. Cn. n.
164	A. Manlius A. f. T. n. Torquatus	Q. Cassius L. f. Q. n. Longinus
163	Ti. Sempronius P. f. Ti. n. Gracchus II	M'. Iuventius T. f. T. n. Thalna

162	P. Cornelius P. f. Cn. n. Scipio Nasica (Corculum)	C. Marcius C. f. Q. n. Figulus
	P. Cornelius L.f. L. n. Lentulus suff.	*Cn. Domitius Cn.f. L. n. Ahenobarbus* suff.
161	M. Valerius M. f. M. n. Messalla	C. Fannius C. f. C. n. Strabo
160	L. Anicius L. f. L. n. Gallus	M. Cornelius C. f. C. n. Cethegus
159	Cn. Cornelius Cn. f. Cn. n. Dolabella	M. Fulvius M. f. M. n. Nobilior
158	M. Aemilius M'. f. M'. n. Lepidus	C. Popillius P. f. P. n. Laenas II
157	Sex. Iulius Sex. f. L. n. Caesar	L. Aurelius L. f. L. n. Orestes
156	L. Cornelius Cn. f. L. n. Lentulus Lupus	C. Marcius C. f. Q. n. Figulus
155	P. Cornelius P. f. Cn. n. Scipio Nasica (Corculum) II	M. Claudius M. f. M. n. Marcellus II
154	Q. Opimius Q. f. Q. n.	L. Postumius Sp. f. L. n. Albinus
		M'. Acilius M'.f. C. n. Glabrio suff.
153	Q. Fulvius M. f. M. n. Nobilior	T. Annius T. f. Luscus
152	M. Claudius M. f. M. n. Marcellus III	L. Valerius L. f. P. n. Flaccus
151	L. Licinius Lucullus	A. Postumius A. f. A. n. Albinus
150	T. Quinctius T. f. T. n. Flamininus	M'. Acilius L. f. K. n. Balbus
149	L. Marcius C. f. C. n. Censorinus	M'. (M.?) Manilius P. f. P. n.
148	Sp. Postumius Sp. f. Sp. n. Albinus Magnus	L. Calpurnius C. f. C. n. Piso Caesoninus
147	P. Cornelius P. f. P. n. Scipio Africanus Aemilianus	C. Livius M. Aemiliani f. M. n. Drusus
146	Cn. Cornelius Cn. f. L. n. Lentulus	L. Mummius L. f. L. n.
145	Q. Fabius Q. f. Q. n. Maximus Aemilianus	L. Hostilius L. f. L. n. Mancinus
144	Ser. Sulpicius Ser. f. P. n. Galba	L. Aurelius L.? f. C. n. Cotta
143	Ap. Claudius C. f. Ap. n. Pulcher	Q. Caecilius Q. f. L. n. Metellus Macedonicus
142	L. Caecilius Q. f. L. n. Metellus Calvus	Q. Fabius Q. f. Q. n. Maximus Servilianus
141	Cn. Servilius Cn. f. Cn. n. Caepio	Q. Pompeius A. f.
140	C. Laelius C. f. C. n. (Sapiens)	Q. Servilius Cn. f. Cn. n. Caepio
139	Cn. Calpurnius Piso	M. Popillius M. f. P. n. Laenas
138	P. Cornelius P. f. P. n. Scipio Nasica Serapio	D. Iunius M. f. M. n. Brutus (Callaicus)
137	M. Aemilius M. f. M. n. Lepidus Porcina	C. Hostilius A. f. L. n. Mancinus
136	L. Furius Philus	Sex. Atilius M. f. C. n. Serranus
135	Ser. Fulvius Q. f. Flaccus	Q. Calpurnius C. f. C. n. Piso
134	P. Cornelius P. f. P. n. Scipio Africanus Aemilianus II	C. Fulvius Q. f. Cn. n. Flaccus
133	P. Mucius P. f. Q. n. Scaevola	L. Calpurnius L. f. C. n. Piso Frugi
132	P. Popillius C. f. P. n. Laenas	P. Rupilius P. f. P. n.
131	P. Licinius P. f. P. n. Dives Crassus Mucianus	L. Valerius L. f. L. n. Flaccus
130	L. Cornelius Lentulus	M. Perperna M. f. L. n.
129	C. Sempronius C. f. C. n. Tuditanus	M'. Aquillius M'. f. M'. n.
128	Cn. Octavius Cn. f. Cn. n.	T. Annius Rufus
127	L. Cassius Longinus Ravilla	L. Cornelius L. f. Cinna
126	M. Aemilius Lepidus	L. Aurelius L. f. L. n. Orestes
125	M. Plautius Hypsaeus	M. Fulvius M. f. Q. n. Flaccus
124	C. Cassius Longinus	C. Sextius C. f. C. n. Calvinus
123	Q. Caecilius Q. f. Q. n. Metellus (Baliaricus)	T. Quinctius T. f. T.? n. Flamininus
122	Cn. Domitius Cn. f. Cn. n. Ahenobarbus	C. Fannius M. f. C.? n.
121	L. Opimius Q. f. Q. n.	Q. Fabius Q. Aemiliani f. Q. n. Maximus (Allobrogicus)
120	P. Manilius P.? f. M'.? n.	C. Papirius C. f. Carbo
119	L. Caecilius L. f. Q. n. Metellus (Delmaticus)	L. Aurelius Cotta
118	M. Porcius M. f. M. n. Cato	Q. Marcius Q. f. Q. n. Rex
117	L. Caecilius Q. f. Q. n. Metellus Diadematus	Q. Mucius Q. f. Q. n. Scaevola (Augur)
116	C. Licinius P. f. Geta	Q. Fabius (Q. Serviliani f. Q. n.) Maximus Eburnus
115	M. Aemilius M. f. L. n. Scaurus	M. Caecilius Q. f. Q. n. Metellus

114	M'. Acilius M'.? f. L. n. Balbus	C. Porcius M. f. M. n. Cato
113	C. Caecilius Q. f. Q. n. Metellus Caprarius	Cn. Papirius C. f. Carbo
112	M. Livius (C. f. M. Aemiliani n.) Drusus	L. Calpurnius (L. f. C. n.) Piso Caesoninus
111	P. Cornelius P. f. P. n. Scipio Nasica Serapio	L. Calpurnius Bestia
110	M. Minucius Q. f. Rufus	Sp. Postumius Albinus
109	Q. Caecilius L. f. Q. n. Metellus (Numidicus)	M. Iunius D. f. D. n. Silanus
108	Ser. Sulpicius Ser. f. Ser. n. Galba	L. (Q.?) Hortensius *M. Aurelius Scaurus* suff.
107	L. Cassius L. f. Longinus	C. Marius C. f. C. n.
106	Q. Servilius Cn. f. Cn. n. Caepio	C. Atilius Serranus
105	P. Rutilius P. f. Rufus	Cn. Mallius Cn. f. Maximus
104	C. Marius C. f. C. n. II	C. Flavius C. f. Fimbria
103	C. Marius C. f. C. n. III	L. Aurelius L. f. L. n. Orestes
102	C. Marius C. f. C. n. IV	Q. Lutatius Q. f. Catulus
101	C. Marius C. f. C. n. V	M'. Aquillius M'. f. M'. n.
100	C. Marius C. f. C. n. VI	L. Valerius L. f. L. n. Flaccus
99	M. Antonius M. f. M. n.	A. Postumius Albinus
98	Q. Caecilius Q. f. Q. n. Metellus Nepos	T. Didius T. f. Sex. n.
97	Cn. Cornelius Cn. f. Cn. n. Lentulus	P. Licinius M. f. P. n. Crassus
96	Cn. Domitius Cn. f. Cn. n. Ahenobarbus	C. Cassius L. f. Longinus
95	L. Licinius L. f. C. n. Crassus	Q. Mucius P. f. P. n. Scaevola
94	C. Coelius C. f. C. n. Caldus	L. Domitius C. f. Cn. n. Ahenobarbus
93	C. Valerius C. f. L. n. Flaccus	M. Herennius M. f.
92	C. Claudius Ap. f. C. n. Pulcher	M. Perperna M. f. M. n.
91	L. Marcius Q. f. Q. n. Philippus	Sex. Iulius C. f. L.? n. Caesar
90	L. Iulius L. f. Sex. n. Caesar	P. Rutilius L. f. L. n. Lupus
89	Cn. Pompeius Sex. f. Cn. n. Strabo	L. Porcius M. f. M. n. Cato
88	L. Cornelius L. f. P. n. Sulla (Felix)	Q. Pompeius Q. f. A.? n. Rufus
87	Cn. Octavius Cn. f. C. n.	L. Cornelius L. f. L. n. Cinna *L. Cornelius Merula* suff.
86	L. Cornelius L. f. L. n. Cinna II	C. Marius C. f. C. n. VII *L. Valerius C.? f. L. n. Flaccus* suff.
85	L. Cornelius L. f. L. n. Cinna III	Cn. Papirius Cn.. f. C. n. Carbo
84	Cn. Papirius Cn. f. C. n. Carbo II	L. Cornelius L. f. L. n. Cinna IV
83	L. Cornelius L. f. L. n. Scipio Asiaticus (Asiagenus)	C. Norbanus
82	C. Marius C. f. C. n.	Cn. Papirius Cn. f. C. n. Carbo III
81	M. Tullius M. f. A. n. Decula	Cn. Cornelius Cn. f. Cn. n. Dolabella
80	L. Cornelius L. f. P. n. Sulla Felix	Q. Caecilius Q. f. L. n. Metellus Pius
79	P. Servilius C. f. M. n. Vatia (Isauricus)	Ap. Claudius Ap. f. C. n. Pulcher
78	M. Aemilius Q. f. M. n. Lepidus	Q. Lutatius Q. f. Q. n. Catulus
77	D. Iunius D. f. M. n. Brutus	Mam. Aemilius Mam. f. Lepidus Livianus
76	Cn. Octavius M. f. Cn. n.	C. Scribonius C. f. Curio
75	L. Octavius Cn. f. C. n.	C. Aurelius M. f. Cotta
74	L. Licinius L. f. L. n. Lucullus	M. Aurelius M. f. Cotta
73	M. Terentius M. f. Varro Lucullus	C. Cassius L. f. Longinus
72	L. Gellius L. f. L. n. Publicola	Cn. Cornelius Cn. f. Lentulus Clodianus
71	P. Cornelius P. f. P. n. Lentulus Sura	Cn. Aufidius Cn. f. Orestes
70	Cn. Pompeius Cn. f. Sex. n. Magnus	M. Licinius P. f. M. n. Crassus
69	Q. Hortensius L. f. Hortalus	Q. Caecilius C. f. Q. n. Metellus (Creticus)
68	L. Caecilius C. f. Q. n. Metellus *(Servilius) Vatia* suff.	Q. Marcius Q. f. Q. n. Rex
67	C. Calpurnius Piso	M'. Acilius M'. f. M'. n. Glabrio
66	M'. Aemilius M'. f. Lepidus	L. Volcatius Tullus
65	L. Aurelius M. f. Cotta	L. Manlius L. f. Torquatus

(Both elected after conviction for bribery of consuls designate P. Cornelius P.? f. L. n. Sulla and P. Autronius L. f. Paetus)

64	L. Iulius L. f. L. n. Caesar	C. Marcius C. f. C. n. Figulus
63	M. Tullius M. f. M. n. Cicero	C. Antonius M. f. M. n. (Hibrida)
62	D. Iunius M. f. Silanus	L. Licinius L. f. L. n. Murena
61	M. Pupius M. f. Piso Frugi Calpurnianus	M. Valerius M. f. M'. n. Messala Niger
60	Q. Caecilius Q. f. Q. n. Metellus Celer	L. Afranius A. f.
59	C. Iulius C. f. C. n. Caesar	M. Calpurnius C. f. Bibulus
58	L. Calpurnius L. f. L. n. Piso Caesoninus	A. Gabinius A. f.
57	P. Cornelius P. f. Cn. n. Lentulus Spinther	Q. Caecilius P. f. Q. n. Metellus Nepos
56	Cn. Cornelius P. f. Lentulus Marcellinus	L. Marcius L. f. Q. n. Philippus
55	Cn. Pompeius Cn. f. Sex. n. Magnus II	M. Licinius P. f. M. n. Crassus Dives II
54	L. Domitius Cn. f. Cn. n. Ahenobarbus	Ap. Claudius Ap. f. Ap. n. Pulcher
53	Cn. Domitius M. f. M. n. Calvinus	M. Valerius Messalla Rufus
52	Cn. Pompeius Cn. f. Sex. n. Magnus III	Q. Caecilius Q. f. Q. n. Metellus Pius Scipio Nasica
51	Ser. Sulpicius Q. f. Rufus	M. Claudius M. f. M. n. Marcellus
50	L. Aemilius M. f. Q. n. Lepidus Paullus	C. Claudius C. f. M. n. Marcellus
49	C. Claudius M. f. M. n. Marcellus	L. Cornelius P. f. Lentulus Crus
48	C. Iulius C. f. C. n. Caesar II	P. Servilius P. f. C. n. Isauricus
47	Q. Fufius Q. f. C. n. Calenus	P. Vatinius P. f.
46	C. Iulius C. f. C. n. Caesar III	M. Aemilius M. f. Q. n. Lepidus
45	C. Iulius C. f. C. n. Caesar IV *Q. Fabius Q.f. Q. n. Maximus* suff. *C. Caninius C.f. C. n. Rebilus* suff.	no colleague *C. Trebonius C.f.* suff.
44	C. Iulius C. f. C. n. Caesar V *P. Cornelius P.f. Dolabella* suff.	M. Antonius M. f. M. n.
43	C. Vibius C. f. C. n. Pansa Caetronianus *C. Iulius C.f. C. n. Caesar* suff. *P. Ventidius P.f. Bassus* suff.	A. Hirtius A. f. *Q. Pedius M.f.* suff. *C. Carrinas C.f.* suff.
	So the literary sources; but *Fasti Capit.* reverses the succession of Ventidius and Carrinas, making Carrinas succed to Octavian, Ventidius to Pedius.	
42	M. Aemilius M. f. Q. n. Lepidus	L. Munatius L. f. L. n. Plancus
41	L. Antonius M. f. M. n. (Pietas)	P. Servilius P. f. C. n. (Vatia) Isauricus)
40	Cn. Domitius M. f. M. n. Calvinus *L. Cornelius L.f. Balbus* suff.	Cn. Asinius Cn. f. Pollio *P. Canidius P.f. Crassus* suff.
39	L. Marcius L. f. C. n. Censorinus *C. Cocceius Balbus* suff.	C. Calvisius C. f. Sabinus *P. Alfenus P.f. Varus* suff.
38	Ap. Claudius C. f. Ap. n. Pulcher *L. Cornelius Lentulus* suff.	C. Norbanus C. f. Flaccus *L. Marcius L.f. L. n. Philippus* suff.
37	M. (Vipsanius) Agrippa L. f.	L. Caninius L. f. Gallus *T. Statilius T.f. Taurus* suff.
36	L. Gellius L. f. L. n. Publicola *L. Nonius L.f. T.? n. Asprenas* suff.	M. Cocceius Nerva *-Marcius-* suff.
35	Sex. Pompeius Sex. f. Sex.? n. *P. Cornelius P.?f. Scipio?* suff.	L. Cornificius L. f. *T. Peducaeus* suff.
34	M. Antonius M. f. M. n. II *L. Sempronius L.f. L. n. Atratinus* suff. *Paullus Aemilius L.f. M. n. Lepidus* *C. Memmius C.f. L. n.* *M. Herennius (M.?f. T.? n. Picens?)*	L. Scribonius L. f. Libo
33	Imp. Caesar Divi f. II *L. Antonius P.f. L. n. Paetus* suff. *L. Flavius* *C. Fonteius C.f. Capito* *M. Acilius M'.f. Glabrio* *L. Vinicius M.f.* *Q. Laronius*	L. Volcatius L. f. Tullus

32	Cn. Domitius L. f. Cn. n. Ahenobarbus *L. Cornelius Cinna* suff. *M. Valerius Messalla*	C. Sosius C. f. T. n.
31	M. Antonius M. f. M. n. III (design.) *M. Valerius M. f. M. n. Messalla Corvinus* suff. *M. Titius L. f.* *Cn. Pompeius Q. f.*	Imp. Caesar Divi f. III

(From 30 *B.C., only ordinary consuls are listed here, without filiation)*

30	Imp. Caesar Divi f. IV	M. Licinius Crassus
29	Imp. Caesar Divi f. V	Sex. Appuleius
28	Imp. Caesar Divi f. VI	M. Vipsanius Agrippa II
27	Imp. Caesar Divi f. VII	M. Vipsanius Agrippa III
26	Imp. Caesar Divi f. Augustus VIII	T. Statilius Taurus II
25	Imp. Caesar Divi f. Augustus IX	M. Iunius Silanus
24	Imp. Caesar Divi f. Augustus X	C. Norbanus Flaccus
23	Imp. Caesar Divi f. Augustus XI	A. Terentius Varro Murena
22	M. Claudius Marcellus Aeserninus	L. Arruntius
21	M. Lollius	Q. Aemilius Lepidus
20	M. Appuleius	P. Silius Nerva
19	C. Sentius Saturninus	Q. Lucretius (Cinna?) Vespillo
18	P. Cornelius Lentulus Marcellinus	Cn. Cornelius Lentulus
17	C. Furnius	C. Iunius Silanus
16	L. Domitius Ahenobarbus	P. Cornelius Scipio
15	M. Livius Drusus Libo	L. Calpurnius Piso Frugi (Pontifex)
14	M. Licinius Crassus	Cn. Cornelius Lentulus (Augur)
13	Ti. Claudius Nero	P. Quinctilius Varus
12	M. Valerius Messalla Barbatus Appianus	P. Sulpicius Quirinius
11	Q. Aelius Tubero	Paullus Fabius Maximus
10	Africanus Fabius Maximus	Iullus Antonius
9	Nero Claudius Drusus	T. Quinctius Crispinus (Sulpicianus)
8	C. Marcius Censorinus	C. Asinius Gallus
7	Ti. Claudius Nero II	Cn. Calpurnius Piso
6	D. Laelius Balbus	C. Antistius Vetus
5	Imp. Caesar Divi f. Augustus XII	L. Cornelius Sulla
4	C. Calvisius Sabinus	L. Passienus Rufus
3	L. Cornelius Lentulus	M. Valerius Messalla Messallinus
2	Imp. Caesar Divi f. Augustus XIII	M. Plautius Silvanus
1	Cossus Cornelius Lentulus	L. Calpurnius Piso (Augur)

A.D.

1	C. Caesar	L. Aemilius Paullus
2	P. Vinicius	P. Alfenus Varus
3	L. Aelius Lamia	M. Servilius
4	Sex. Aelius Catus	C. Sentius Saturninus
5	L. Valerius Messalla Volesus	Cn. Cornelius Cinna Magnus
6	M. Aemilius Lepidus	L. Arruntius
7	Q. Caecilius Metellus Creticus Silanus	Licinius Nerva Silianus
8	M. Furius Camillus	Sex. Nonius Quinctilianus
9	C. Poppaeus Sabinus	Q. Sulpicius Camerinus
10	P. Cornelius Dolabella	C. Iunius Silanus
11	M'. Aemilius Lepidus	T. Statilius Taurus
12	Germanicus Caesar	C. Fonteius Capito
13	C. Silius A. Caecina Largus (cf. Panciera, above, p. 255, note 1)	L. Munatius Plancus
14	Sex. Pompeius	Sex. Appuleius
15	Drusus Caesar	C. Norbanus Flaccus

16	Sisenna Statilius Taurus	L. Scribonius Libo
17	L. Pomponius Flaccus	C. Caelius Rufus (Nepos?)
18	Ti. Caesar Augustus III	Germanicus Caesar II
19	M. Iunius Silanus Torquatus	L. Norbanus Balbus
20	M. Valerius Messalla Messallinus	M. Aurelius Cotta Maximus Messallinus
21	Ti. Caesar IV	Drusus Caesar II
22	D. Haterius Agrippa	C. Sulpicius Galba
23	C. Asinius Pollio	C. Antistius Vetus
24	Ser. Cornelius Cethegus	L. Visellius Varro
25	Cossus Cornelius Lentulus	M. Asinius Agrippa
26	Cn. Cornelius Lentulus Gaetulicus	C. Calvisius Sabinus
27	L. Calpurnius Piso	M. Licinius Crassus Frugi
28	C. Appius Iunius Silanus	P. Silius Nerva
29	C. Fufius Geminus	L. Rubellius Geminus
30	M. Vinicius	L. Cassius Longinus
31	Ti. Caesar V	L. Aelius Seianus
32	Cn. Domitius Ahenobarbus	L. Arruntius (Furius) Camillus Scribonianus
33	L. Livius Ocella Sulpicius Galba	L. Cornelius Sulla Felix
34	Paullus Fabius Persicus	L. Vitellius
35	C. Cestius Gallus	M. Servilius Nonianus
36	Sex. Papinius Allenius	Q. Plautius
37	Cn. Acerronius Proculus	C. Petronius Pontius Nigrinus
38	M. Aquila Iulianus	P. Nonius Asprenas
39	C. Caesar Augustus Germanicus II	L. Apronius Caesianus
40	C. Caesar III	C. Laecanius Bassus
41	C. Caesar IV	Cn. Sentius Saturninus
42	Ti. Claudius Caesar Augustus Germanicus II	C. Caecina Largus
43	Ti. Claudius III	L. Vitellius II
44	T. Statilius Taurus	C. (Sallustius) Passienus Crispus II
45	M. Vinicius II	T. Statilius Taurus Corvinus
46	D. Valerius Asiaticus II	M. Iunius Silanus
47	Ti. Claudius IV	L. Vitellius III
48	A. Vitellius	L. Vipstanus Publicola Messalla
49	Q. Veranius	C. Pompeius Longinus Gallus
50	C. Antistius Vetus II	M. Suillius Nerullinus
51	Ti. Claudius V	Ser. Cornelius (Scipio) Salvidienus Orfitus
52	Faustus Cornelius Sulla Felix	L. Salvius Otho Titianus
53	D. Iunius Silanus Torquatus	Q. Haterus Antoninus
54	M'. Acilius Aviola	M. Asinius Marcellus
55	Nero Claudius Caesar Augustus Germanicus	L. Antistius Vetus
56	Q. Volusius Saturninus	P. Cornelius (Lentulus?) Scipio
57	Nero II	L. Calpurnius Piso
58	Nero III	M. Valerius Messalla Corvinus
59	C. Vipstanus Apronianus	C. Fonteius Capito
60	Nero IV	Cossus Cornelius Lentulus
61	P. Petronius Turpilianus	L. Caesennius Paetus
62	P. Marius Celsus	L. Asinius Gallus
63	C. Memmius Regulus	L. Verginius Rufus
64	C. Laecanius Bassus	M. Licinius Crassus Frugi
65	A. Licinius Nerva Silianus Firmus Pasidienus	M. (Iulius) Vestinus Atticus
66	C. Luccius Telesinus	C. Suetonius Paullinus II?
67	L. Iulius Rufus	Fonteius Capito
68	Ti. Catius Asconius Silius Italicus	P. Galerius Trachalus
69	Ser. Sulpicius Galba Imperator Caesar Augustus II	T. Vinius (Rufinus?)
70	Imp. Caesar Vespasianus Augustus II	Titus Caesar Vespasianus
71	Imp. Vespasianus III	M. Cocceius Nerva

72	Imp. Vespasianus IV	Titus Caesar II
73	Caesar Domitianus II	L. Valerius Catullus Messallinus
74	Imp. Vespasianus V	Titus Caesar III
75	Imp. Vespasianus VI	Titus Caesar IV
76	Imp. Vespasianus VII	Titus Caesar V
77	Imp. Vespasianus VIII	Titus Caesar VI
78	D. Iunius Novius Priscus (Rufus?)	L. Ceionius Commodus
79	Imp. Vespasianus IX	Titus Caesar VII
80	Imp. Titus Caesar Vespasianus Augustus VIII	Caesar Domitianus VII
81	L. Flavius Silva Nonius Bassus	L.? Asinius Pollio Verrucosus
82	Imp. Domitianus VIII	T. Flavius Sabinus
83	Imp. Domitianus IX	Q. Petillius Rufus II
84	Imp. Domitianus X	C. Oppius Sabinus
85	Imp. Domitianus XI	cf. Syme, *JRS* 43, 1953, p. 155; Degrassi, *Athenaeum* 33, 1955, pp. 112–116
86	Imp. Domitianus XII	Ser. Cornelius Dolabella Petronianus
87	Imp. Domitianus XIII	L. Volusius Saturninus
88	Imp. Domitianus XIV	L. Minucius Rufus
89	T. Aurelius Fulvus	M. Asinius Atratinus
90	Imp. Domitianus XV	M. Cocceius Nerva II
91	M'. Acilius Glabrio	M. Ulpius Traianus
92	Imp. Domitianus XVI	Q. Volusius Saturninus
93	Sex. Pompeius Collega	Q. Peducaeus Priscinus
94	L. Nonius Calpurnius Asprenas Torquatus	T. Sextius Magius Lateranus
95	Imp. Domitianus XVII	T. Flavius Clemens
96	C. Manlius Valens	C. Antistius Vetus
97	Imp. Nerva Caesar Augustus III	L. Verginius Rufus III
98	Imp. Nerva Caesar Augustus IV	Imp. Caesar Nerva Traianus Augustus II
99	A. Cornelius Palma Frontonianus	Q. Sosius Senecio
100	Imp. Traianus III	Sex. Iulius Frontinus III
101	Imp. Traianus IV	Q. Articuleius Paetus
102	L. Iulius Ursus Servianus II	L. Licinius Sura II
103	Imp. Traianus V	M'. Laberius Maximus II
104	Sex. Attius Suburanus Aemilianus II	M. Asinius Marcellus
105	Ti. Iulius Candidus Marius Celsus II	C. Antius A. Iulius Quadratus II
106	L. Ceionius Commodus	Sex. Vettulenus Civica Cerialis
107	L. Licinius Sura III	Q. Sosius Senecio II
108	Ap. Annius Trebonius Gallus	M. Atilius Metilius Bradua
109	A. Cornelius Palma Frontonianus II	P. Calvisius Tullus Ruso
110	M. Peducaeus Priscinus	Ser. (Cornelius) Scipio Salvidienus
111	C. Calpurnius Piso	M. Vettius Bolanus
112	Imp. Traianus VI	T. Sextius Africanus
113	L. Publilius Celsus II	C. Clodius Crispinus
114	Q. Ninnius Hasta	P. Manilius Vopiscus Vicinillianus
115	L. Vipstanus Messalla	M. Pedo Vergilianus
116	L. Fundanius Lamia Aelianus	Sex. Carminius Vetus
117	Q. Aquilius Niger	M. Rebilus Apronianus
118	Imp. Caesar Traianus Hadrianus Augustus II	Cn. Pedanius Fuscus Salinator
119	Imp. Hadrianus III	P. Dasumius Rusticus
120	L. Catilius Severus Iulianus Claudius Reginus II	T. Aurelius Fulvus Boionius Arrius Antonius
121	M. Annius Verus II	Cn. Arrius Augur
122	M'. Acilius Aviola	Corellius Pansa
123	Q. Articuleius Paetinus	L. Venuleius Apronianus Octavius Priscus
124	M'. Acilius Glabrio	C. Bellicius Flaccus Torquatus Tebanianus
125	M. Lollius Paullinus D. Valerius Asiaticus Saturninus II	L. Epidius Titius Aquilinus

126	M. Annius Verus III	C. Eggius Ambibulus
127	T. Atilius Rufus Titianus	M. Gavius (Claudius) Squilla Gallicanus
128	L. Nonius Calpurnius Asprenas Torquatus II	M. Annius Libo
	cf. Polotsky, *Israel Exploration Journal* 12, 1962, p. 259 for P. Metilius Nepos II as colleague of Libo	
129	P. Iuventius Celsus T. Aufidius Hoenius Severianus II	L. Neratius Marcellus II
130	Q. Fabius Catullinus	M. Flavius Aper
131	M. Ser. Octavius Laenas Pontianus	M. Antonius Rufinus
132	C. Iunius Serius Augurinus	C. (M.?) Trebius Sergianus (or praenomen P. - cf. Polotsky, *Israel Exploration Journal* 12, 1962, p. 259
133	M. Antonius Hiberus	P. Mummius Sisenna
134	L. Iulius Ursus Servianus III	T. Vibius Varus
135	L. Tutilius Lupercus Pontianus	P. Calpurnius Atilianus (Atticus Rufus?)
136	L. Ceionius Commodus	Sex. Vettulenus Civica Pompeianus
137	L. Aelius Caesar II	P. Coelius Balbinus Vibullius Pius
138	Canus Iunius Niger	C. Pomponius Camerinus
139	Imp. Caesar T. Aelius Hadrianus Antoninus Augustus Pius II	C. Bruttius Praesens L. Fulvius Rusticus II
140	Imp. Antoninus Pius III	M. Aelius Aurelius Verus Caesar
141	T. Hoenius Severus	M. Peducaeus Stloga Priscinus
142	L. Cuspius Pactumeius Rufinus	L. Statius Quadratus
143	C. Bellicius Flaccus? Torquatus	L. Vibullius Hipparchus Ti. Claudius Atticus Herodes
144	L. Lollianus Avitus	T. Statilius Maximus
145	Imp. Antoninus Pius IV	M. Aurelius Caesar II
146	Sex. Erucius Clarus II	Cn. Claudius Severus Arabianus
147	C. Prastina Pacatus Messallinus	L. Annius Largus
148	L. Octavius Cornelius P. Salvius Iulianus Aemilianus	C. Bellicius Calpurnius Torquatus
149	Ser. Cornelius Scipio L.? Salvidienus Orfitus	Q. (Pompeius) Sosius Priscus
150	M. Gavius Squilla Gallicanus	Sex. Carminius Vetus
151	Sex. Quintilius Condianus	Sex. Quintilius Valerius Maximus
152	M'. Acilius Glabrio Cn. Cornelius Severus	M. Valerius Homullus
153	L. Fulvius C. Bruttius Praesens etc.	A. Iunius Proculus
154	L. Aelius Aurelius Commodus	T. Sextus Lateranus
155	C. Iulius Severus	M. Iunius Rufinus Sabinianus
156	M. Ceionius Silvanus	C. Serius Augurinus
157	M. (Ceionius) Civica Barbarus	M. Metilius Aquillius Regulus Nepos Volusius Torquatus Fronto
158	Sex. Sulpicius Tertullus	Q. Tineius Sacerdos Clemens
159	Plautius Quintillus (Quintilius)	M. Statius Priscus Licinius Italicus
160	Appius Annius Atilius Bradua	T. Clodius Vibius Varus
161	M. Aurelius Caesar III = after 7 Mar: Imp. Caesar M. Aurelius Antoninus Augustus III	L. Aelius Aurelius Commodus II = after 7 Mar: Imp. Caesar L. Aurelius Verus Augustus II
162	Q. Iunius Rusticus II	L. Titius Plautius Aquilinus
163	M. Pontius Laelianus	A. Iunius Pastor L. Caesennius Sospes
164	M. Pompeius Macrinus	P. Iuventius Celsus
165	M. Gavius Orfitus	L. Arrius Pudens
166	Q. Servilius Pudens	L. (A.) Fufidius Pollio
167	Imp. L. Aurelius Verus III	M. Ummidius Quadratus
168	L. Venuleius Apronianus Octavius II	L. Sergius Paullus II
169	Q. Pompeius Senecio Roscius Murena Coelius etc.	M. Aqu(ilius?) P. Coelius Apollinaris

170	C. (Sex.) Erucius Clarus	M. Gavius Cornelius Cethegus
171	T. Statilius Severus	L. Alfidius Herennianus
172	Ser. (Calpurnius) Scipio Orfitus	Quintilius Maximus
173	Cn. Claudius Severus II	Ti. Claudius Pompeianus II
174	L. Aurelius Gallus	Q. Volusius Flaccus Cornelianus
175	L. Calpurnius Piso	P. Salvius Iulianus
176	T. Pomponius Proculus Vitrasius Pollio II	M. Flavius Aper II
177	Imp. Caesar L. Aelius Commodus Augustus	P. Peducaeus Plautius Quintillus
178	Ser. (Cornelius) Scipio (Salvidienus) Orfitus	D. Velius Rufus (Iulianus?)
179	Imp. Commodus II	P. Martius Verus II
180	L. Fulvius C. Bruttius Praesens etc. II	Sex. Quintilius Condianus (II?)
181	Imp. Caesar M. Aurelius Commodus Antonius Augustus III	L. Antistius Burrus
182	M. Petronius Sura Mamertinus	Q. Tineius Rufus
183	Imp. Commodus IV	C. Aufidius Victorinus etc. II
184	L. Cossonius Eggius Marullus	Cn. Papirius Aelianus C. Octavius Vindex
185	Maternus	Ti. Claudius M. Appius Atilius Bradua Regillus Atticus
186	Imp. Commodus V	M'. Acilius Glabrio II
187	L. Bruttius Quintius Crispinus	L. Roscius Aelianus Paculus
188	P.? Seius Fuscianus II	M. Servilius Silanus II
189	Dulius (D. Iulius?) Silanus	Q. Servilius Silanus
190	Imp. Commodus VI	M. Petronius Sura Septimianus
191	Opilius Pedo Apronianus	M. Valerius Bradua Mauricus
192	Imp. Commodus VII	P. Helvius Pertinax II
193	Q. Pompeius Sosius Falco	C. Iulius Erucius Clarus Vibianus
194	Imp. Caesar L. Septimius Severus Pertinax Augustus II	D. Clodius Septimius Albinus Caesar II
195	P. Iulius Scapula Tertullus Priscus	Q. Tineius Clemens
196	C. Domitius Dexter II	L. Valerius Messalla Thrasea Priscus
197	T. Sextus Lateranus	L. Cuspius Rufinus
198	P. Martius Sergius Saturninus	L. Aurelius Gallus
199	P. Cornelius Anullinus II	M. Aufidius Fronto
200	Ti. Claudius Severus Proculus	C. Aufidius Victorinus
201	L. Annius Fabianus	M. Nonius Arrius Mucianus
202	Imp. Severus III	Imp. Caesar M. Aurelius Severus Antoninus Augustus
203	C. Fulvius Plautianus II	P. Septimius Geta II
204	L. Fabius Cilo Septiminus Catinius Acilianus Lepidus Fulcinianus II	M. Annius Flavius Libo
205	Imp. Antoninus II	P. Septimius Geta Caesar
206	M. Nummius Umbrius Primus Senecio Albinus	Fulvius (Gavius Numisius Petronius?) Aemilianus
207	(L.?) Annius Maximus	L. Septimius Aper
208	Imp. Antoninus III	Geta Caesar II
209	Pompeianus	Avitus
210	M'. Acilius Faustinus	A. Triarius Rufinus
211	Terentius Gentianus	Bassus
212	C. Iulius Asper II	C. Iulius (Camilius?) Galerius Asper
213	Imp. Antoninus IV	D. Caelius (Calvinus) Balbinus II
214	L. Valerius Messalla (Apollinaris?)	C. Octavius Appius Suetrius Sabinus
215	(Q.) Maecius Laetus II	M. Munatius Sulla Cerialis
216	P. Catius Sabinus II	P. Cornelius Anullinus
217	C. Bruttius Praesens	T. Messius Extricatus II
218	Imp. Caesar M. Opellius Severus Macrinus Augustus	Oclatinius Adventus // after 8 June: Imp. Caesar M. Aurelius Antoninus Augustus
219	Imp. Antoninus II	Q. Tineius Sacerdos II

220	Imp. Antoninus III	P. Valerius Comazon Eutychianus
221	C. Vettius Gratus Sabinianus	M. Flavius Vitellius Seleucus
222	Imp. Antoninus IV	M. Aurelius Severus Alexander Caesar // from 13 Mar. = Imp. Caesar M. Aurelius Severus Alexander Augustus
223	L. Marius Maximus Perpetuus Aurelianus II	L. Roscius Aelianus Paculus Salvius Iulianus
224	Ap. Claudius Iulianus II	C. Bruttius Crispinus
225	Ti. Manilius Fuscus II	Ser. Calpurnius Domitius Dexter
226	Imp. Severus Alexander II	C. Aufidius Marcellus II
227	M. Nummius Senecio Albinus	M. Laelius (Fulvius?) Maximus Aemilianus
228	Q. Aiacius Modestus Crescentianus II	M. (Pomponius?) Maecius Probus
229	Imp. Severus Alexander III	Cassius Dio Cocceianus II
230	L. Virius Agricola	Sex. Catius Clementinus Priscillianus
231	Claudius Pompeianus	T. Flavius Sallustius Paelignianus
232	L. Virius Lupus (Iulianus?)	L. Marius Maximus
233	L. Valerius Maximus	Cn. Cornelius Paternus
234	M. Clodius Pupienus Maximus II	(Su?)lla Urbanus
235	Cn. Claudius Severus	L. Ti. Claudius Aurelius Quintianus
236	Imp. Caesar C. Iulius Verus Maximinus Augustus	M. Pupienus Africanus
237	L. Marius Perpetuus	L. Mummius Felix Cornelianus
238	(C.?) Fulvius Pius	Pontius Proculus Pontianus
239	Imp. Caesar M. Antonius Gordianus Augustus	M. (M'.?) Acilius Aviola
240	Sabinus II	Se(ius?) Venustus
241	Imp. Gordianus II	(Clodius) Pompeianus
242	C. Vettius Gratus Atticus Sabinianus	C. Asinius Lepidus Praetextatus
243	L. Annius Arrianus	C. Cervonius Papus
244	T. Pollenius Armenius Peregrinus	Fulvius Aemilianus
245	Imp. Caesar M. Iulius Philippus Augustus	C. Maesius Titianus
246	C. Bruttius Praesens	C. All(—) Albinus
247	Imp. Philippus II	Imp. Caesar M. Iulius Severus Philippus
248	Imp. Philippus III	Imp. Philippus II
249	Fulvius Aemilianus II	L. Naevius Aquilinus
250	Imp. Caesar C. Messius Quintus Traianus Decius II	Vettius Gratus
251	Imp. Decius (Divus Decius) III	Q. Herennius Etruscus Messius Decius Caesar
252	Imp. Caesar C. Vibius Trebonianus Gallus Augustus II	Imp. Caesar C. Vibius Afinius Gallus Veldumnianus Volusianus Augustus
253	Imp. Volusianus II	Valerius Maximus
254	Imp. Caesar P. Licinius Valerianus Augustus II	Imp. Caesar P. Licinius Egnatius Gallienus Augustus
255	Imp. Valerianus III	Imp. Gallienus II
256	L. Valerius Maximus II	M. Acilius Glabrio
257	Imp. Valerianus IV	Imp. Gallienus III
258	M. Nummius Tuscus	Mummius Bassus
259	(Nummius) Aemilianus (Dexter)	(Ti. Pomponius) Bassus
260	P. Cornelius Saecularis II	C. Iunius Donatus II
261	Imp. Gallienus IV	L. Petronius Taurus Volusianus
	// in Gaul: Imp. Caesar M. Cassianus Latinius Postumus Augustus II	
262	Imp. Gallienus V	Nummius Faustianus
	// in Gaul: Imp. Postumus III	
263	(M.) Nummius (Ceionius) Albinus II	Dexter (Maximus?)
264	Imp. Gallienus VI	Saturninus
265	(Licinius) Valerianus II	Lucillus
266	Imp. Gallienus VII	Sabinillus

267	Paternus // in Gaul: Imp. Postumus IV	Archesilaus // M. Piavonius Victorinus
268	(Aspasius?) Paternus II	(Egnatius?) Marinianus
269	Imp. Caesar M. Aurelius Valerius Claudius Augustus // in Gaul: Imp. Postumus V	Paternus // Imp. Victorinus Augustus
270	Flavius Antiochianus II	Virius Orfitus
271	Imp. Caesar L. Domitius Aurelianus Augustus // in Gaul: Imp. Caesar C. Pius Esuvius Tetricus Augustus	(Ti.) Pomponius Bassus II
272	Quietus // in Gaul: Imp. Tetricus II	Iunius Veldumnianus
273	M. Claudius Tacitus	(Iulius) Placidianus
274	Imp. Aurelianus II // in Gaul: Imp. Tetricus III	Capitolinus
275	Imp. Aurelianus III	Marcellinus
276	Imp. Tacitus II	Aemilianus
277	Imp. Caesar M. Aurelius Probus Augustus	Paulinus
278	Imp. Probus II	Virius Lupus
279	Imp. Probus III	Nonius Paternus II
280	Messalla	Gratus
281	Imp. Probus IV	C. Iunius Tiberianus
282	Imp. Probus V	Victorinus
283	Imp. Caesar M. Aurelius Carus Augustus II	Imp. Caesar M. Aurelius Carinus
284	Imp. Carinus II	Imp. Caesar M. Aurelius Numerius Numerianus Augustus
285	Imp. Carinus III (after death of Carinus: Imp. Caesar C. Aurelius Valerius Diocletianus Augustus II)	T. Claudius M. Aurelius Aristobulus
286	M. Iunius Maximus II	Vettius Aquilinus
287	Imp. Diocletianus III	Imp. Caesar M. Aurelius Valerius Maximianus Augustus
288	Imp. Maximianus II	Pomponius Ianuarianus
289	L. Ragonius Quintianus	M. Magrius Bassus
290	Imp. Diocletianus IV	Imp. Maximianus III
291	C. Iunius Tiberianus II	Cassius Dio
292	Afranius Hannibalianus	Iulius Asclepiodotus
293	Imp. Diocletianus V	Imp. Maximianus IV
294	C. Flavius Valerius Constantius Nobilissimus Caesar	C. Galerius Valerius Maximianus Nobilissimus Caesar
295	Nummius Tuscus	C. Annius Anullinus
296	Imp. Diocletianus VI	Constantius Caesar II
297	Imp. Maximianus V	Maximianus Caesar II
298	(M. Iunius Caesonius Nicomachus) Anicius Faustus (Paulinus) II	Virius Gallus
299	Imp. Diocletianus VII	Imp. Maximianus VI
300	Constantius Caesar III	Maximianus Caesar III
301	T. Flavius Postumius Titianus II	Virius Nepotianus
302	Constantius Caesar IV	Maximianus Caesar IV
303	Imp. Diocletianus VIII	Imp. Maximianus VII
304	Imp. Diocletianus IX	Imp. Maximianus VIII
305	Constantius Caesar V (after 1 May Augustus)	Maximianus Caesar V (after 1 May Augustus)
306	Flavius Valerius Constantius Augustus VI	C. Galerius Valerius Maximianus Augustus VI
307	West: Maximianus IX	L. (M.? C.?) Flavius Valerius Constaninus Nobilissimus Caesar
	Rome: Maximianus IX	C. Valerius Galerius Maximinus Nobilissimus Caesar

307	East: Flavius Valerius Severus Augustus	C. Valerius Galerius Maximinus Nobilissimus Caesar
308	Diocletianus X	Galerius Maximianus VII
	Rome: M. Aurelius Valerius Maxentius Augustus	M. Valerius Romulus
309	Rome: Maxentius II	M. Valerius Romulus II
	East: Valerius Licinianus Licinus Augustus	L. Flavius Valerius Constantinus Augustus
310	Rome: Maxentius III	Pompeius Probus
	East: Tatius Andronicus	
311	Galerius Maximianus VIII	C. Valerius Galerius Maximinus Augustus II
312	Constantinus II	Licinius II
	Rome: Maxentius IV	
313	Constantinus III	Licinius III
	Rome: Maximinus III	
314	C. Caeionius Rufius Volusianus II	Petronius Annianus
315	Constantinus IV	Licinius IV
316	Antonius Caecina? Sabinus	Vettius Rufinus
317	Ovinius Gallicanus	Caesonius Bassus (P. Col. inv. 173, cf. Gilliam, *Historia* 16, 1967, p. 252)
318	Licinius V	Flavius Iulius Valerius Crispus Nobilissimus Caesar
319	Constantinus V	Valerius Licinianus Licinius Nobilissimus Caesar
320	Constantinus VI	Flavius Claudius Constantinus Nobilissimus Caesar
321	West: Crispus Caesar II	Constantinus Caesar II
	East: Licinius VI	Licinius Caesar II
322	Petronius Probianus	Amnius Anicius Iulianus
323	Acilius Severus	Vettius Rufinus
324	Crispus Caesar III	Constantinus Caesar III
325	Sex. Anicius (Faustus) Paulinus II	P. Caeionius Iulianus
326	Constantinus VII	Flavius Iulius Constantius Nobilissimus Caesar
327	Flavius Constantius	Valerius Maximus
328	Flavius Ianuarinus	Vettius Iustus
329	Constantinus VIII	Constantinus Caesar IV
330	Flavius Gallicanus	Valerius Tullianus Symmachus
331	Iulius Annius Bassus	Flavius Ablabius
332	L. Papinius (Fabius) Pacatianus	Maecilius Hilarianus
333	Flavius Iulius Delmatius	Domitius Zenofilus
334	Flavius Optatus	Ammius Manius Caesonius Nicomachus Anicius Paulinus
335	Flavius Iulius Constantius	Caeionius Rufius Albinus
336	Virius Nepotianus	Tettius Facundus
337	Flavius Felecianus	Fabius Titianus
338	Flavius Ursus	Flavius Polemius
339	Flavius Iulius Constantius Augustus II	Flavius Iulius Claudius Constans Augustus
340	Septimius Acydinus	L. Aradius Val(erius?) Proculus
341	Antonius Marcellinus	Petronius Probinus
342	Constantius III	Constans II
343	M. Maccius Memmius Furius Babrius Caecilianus Placidus	Flavius Pisidius Romulus
344	Flavius Domitius Leontius	Flavius Sallustius Bonosus
345	Flavius Amantius	Flavius Rufius Albinus
346	Constantius IV	Constans III
347	Vulcacius Rufinus	Flavius Eusebius

348	Flavius Filippus	Flavius Salia
349	Ulpius Limenius	Flavius Aco Catullinus Philomathus
350	Flavius Anicius Sergius	Flavius Nigrinianus
351	West: Flavius Magnus Magnentius Augustus	Gaiso
352	West: Flavius Magnus Decentius Nobilissimus Caesar	Paulus
	East: Constantius V	Flavius Claudius Constantius Gallus Nobilissimus Caesar
353	Constantius VI	Constantius Caesar II
	// Gaul: Magnentius II	Decentius Caesar II
354	Constantius VII	Constantius Caesar III
355	Flavius Arbitio	Q. Flavius Maesius Egnatius Lollianus
356	Constantius VIII •	Flavius Claudius Iulianus Nobilissimus Caesar
357	Constantius IX	Iulianus Caesar II
358	Datianus	Naeratius Cerealis
359	Flavius Eusebius	Flavius Hypatius
360	Constantius X	Iulianus Caesar III
361	Flavius Palladius Rutilius Taurus Aemilianus	Flavius Florentius
362	Flavius Claudius Mamertinus	Flavius Nevitta
363	Flavius Claudius Iulianus Augustus IV	Flavius Sallustius
364	Flavius Iovianus Augustus	Flavius Varronianus
365	Flavius Valentinianus Augustus	Flavius Valens Augustus
366	Flavius Gratianus	Dagalaifus
367	Flavius Lupicinus	Flavius Iovinus
368	Valentinianus II	Valens II
369	Flavius Valentinianus	Flavius Victor
370	Valentinianus III	Valens III
371	Flavius Gratianus Augustus II	Sex. (Anicius) Flavius Petronius Probus
372	Flavius Domitius Modestus	Flavius Arintheus
373	Valentinianus IV	Valens IV
374	Gratianus III	Flavius Equitius
375		
376	Valens V	Flavius Valentinianus Iun. Augustus
377	Gratianus IV	Flavius Merobaudes
378	Valens VI	Valentinianus Iun. II
379	D. Magnus Ausonius	Q. Clodius Hermogenianus Olybrius
380	Gratianus V	Flavius Theodosius Augustus
381	Flavius Syagrius	Flavius Eucherius
382	Flavius Claudius Antonius	Flavius Afranius Syagrius
383	Flavius Merobaudes II	Flavius Saturninus
384	Flavius Ricomer // Gaul: Flavius Magnus Maximus Augustus	Flavius Clearchus
385	Flavius Arcadius Augustus	Flavius Bauto
386	Flavius Honorius	Flavius Euodius
387	Valentinianus III	Eutropius
388	Theodosius II +++?	Flavius Maternus Cynegius
389	Flavius Timasius	Flavius Promotus
390	Valentinianus IV	Flavius Neoterius
391	Q. Flavius Tatianus	Q. Flavius Aurelius Symmachus
392	Arcadius II	Flavius Rufinus
393	Theodosius III	Flavius Abundantius West: Flavius Eugenius Augustus

394	Arcadius III West: Virius Nicomachus Flavianus (alone)	Honorius II
395	Flavius Anicius Hermogenianus Olybrius	Flavius Anicius Probinus
396	Arcadius IV	Honorius III
397	Flavius Caesarius	Flavius Nonius Atticus Maximus
398	Honorius IV	Flavius Eutychianus

INDICES

A NOTE ON THE INDICES

The indices, particularly the index of months, are constructed to be an integral part of this work, and are intended to serve as reference material, as well as purely a locator for material in the text. Accordingly, I have indicated in the index of documentary sources the abbreviations followed in the text, and I have tried to make that index of sources as a whole a bibliography of ancient sources dealing with calendaric and chronographic material.

The index of months lists all the months I have dealt with in the text with the different forms attested, and indicates the ancient locations at which the months are attested, with page references. Because the sources, and my own text, often refer to the months in Latin script, I have chosen to index the months in Latin transliteration, and a word on the form of transliteration may be useful. I have alphabetized all aspirated names under 'h'; in general, 'u' has been used to transliterate upsilon, although I have followed my own habit of transliterating upsilon by 'y' in such formations as Hyakinthios, etc., and in transliterating Egyptian and Macedonian months as Dystros and Tybi, for example. I have given cross references to alternate spellings of the same name, when the alternates are not immediately apparent or adjacent to each other; ê transliterates eta, ô transliterates omega, and both of these are alphabetized as if the macron were not there, *except* when *only* the macron differentiates between two alternate orthographies, in which circumstance the version with the macron follows that without.

The index of subjects follows the spellings of names in the text, with its deliberate inconsistencies. I have spelled all ancient authors in their Latin forms, while I have transliterated directly names of months, ancient historical personages, archons, etc. Names of places give me much trouble: I find Korkyra uncomfortable in English. I have, accordingly, used Latin spellings for places familiar to me in their latinate form, and used transliteration for places familiar to me in that form, and alphabetized according to English alphabetic order.

Finally, I have not indexed extensive tabular material at all. Specifically, the following parts of the text are not indexed:

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